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<p>These proceedings document the second national Workshop On Human Resource Innovation in Shipbuilding/Ship Repair, which was held on November 26th-28th, 1984. The text of the proceedings consists of case studies and technical reports presented by shipbuilding labor and management members from around the world. The objective of the workshop was to introduce new management practices and organizational structures designed to better utilize the shipbuilding human resource. This workshop was designed to convey its theme to an audience consisting of representatives from United States and overseas shipyards, labor unions, The United States Department of Labor, The Maritime Administration, and major universities.</p>			
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HUMAN RESOURCE INNOVATION IN SHIPBUILDING AND SHIP REPAIR

“Workshop Proceedings”

**Sponsored by the
Education Panel (SP9) Ship Production Committee,
Society of Naval Architects and Marine Engineers,
and the National Shipbuilding Research Program**

May 1985

**Contract No. DTMA-91-84-C-41045
The University of Michigan
Ann Arbor, Michigan**

FOREWORD

The human resource is the single most important asset employed in the production of ships.

This document is the proceedings of a second annual workshop devoted to the dissemination of new managerial practices and organizational concepts developed for implementation within United States shipyards. The proper implementation of these new concepts has radically improved the productivity at certain shipbuilding firms as indicated by the case studies in this text.

The overall objective of the workshop was to examine both the content and the process of human resource innovation that is evident in shipbuilding throughout the world today.

The workshop was oriented to allow for presentation of case studies and professional papers in the following topical sequence:

- Case Studies
 - United States commercial shipyard;
 - United States naval shipyard;
 - Japanese commercial shipyard;
 - British commercial shipyard;
- Bureaucratization and Professionalism as Options in the Redesign of Shipbuilding Organizations
- Technological and Organizational Change
- Employee Involvement
- Alignment of Management Structures in Support of Labor-Management Cooperation Efforts
- Break Out Workshops

The workshop was held November 26-28, 1984, in Baltimore Maryland. It was produced and directed by the SP-5 Human Resource Innovation Panel. It was sponsored by the SP-9 Panel of Education and Training. Participants included representatives of U.S. and foreign shipyards, labor unions, universities, research organizations, and the U.S. government.

Project Manager and workshop facilitator was Dr. Michael E. Gaffney, Program Manager of the SP-5 Panel and Associate Director of Management Programs, New York State School of Industrial and Labor Relations, Cornell University. Special thanks are in order to Shannon Armstrong and Cathy Mooney for their time and dedication to this project.

This workshop proceeding is one of many projects managed and cost-shared by The University of Michigan for the National Shipbuilding Research Program. The program is a cooperative effort of the Maritime Administration's Office of Advanced Ship Development, the U.S. Navy, the U.S. shipbuilding industry, and selected academic institutions. Funding for this workshop and publication has been partially provided by the Department of Labor.

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AGENDA

November 26 (First Day)

7-11:00 Reception

November 27 (Second Day)

8:30 Welcome, Introductions

Frank Long, Chairman of the Human Resource Innovation Panel (SP5)

Michael E. Gaffney, Program Manager of the Human Resource Innovation Panel (SP5)

Howard Bunch, Chairman of the Education & Training Panel (SP9)

8:45 Maritime Administration

Virgil Rinehart, Director of the Office of Advanced Ship Development & Technology

8:50 Department of Labor

John R. Stepp, Acting Associate Deputy Under-Secretary for Labor-Management Relations and Cooperative Programs

8:55 Cornell University

Lois Gray, Associate Dean of the New York State School of Industrial and Labor Relations

9:00 Case Study #1 — Bethlehem Steel Corporation, Beaumont Shipyard

Barry Long, Assistant General Manager

G.L. "Bud" Rauwerda, Union Employee Involvement Coordinator

Ken Smith, Management Employee Involvement Coordinator

10:45 Case Study #2— Japan

Hideaki Okamoto, Chairman of the Department of Business & Management at Hosei University

1:15 Bureaucratization and Professionalism As Options in Redesign of Shipbuilding Organizations: Notes on the German Case

Heinz Dieter Meyer, New York State School of Industrial & Labor Relations at Cornell University

2:15 Technological and Organizational Change in European Shipbuilding

Peter Lazear, Programs for Employment and Workplace Systems at Cornell University

3:15 Employee Involvement at Bethlehem Steel Awareness and Application

John Eck, Union Employee Involvement Coordinator at Bethlehem Steel Corporation at the Lebanon Plant

4:15 Alignment of Management Structures in Support of Labor-Management Cooperation Efforts

Randy Duke and Jess Christman of the CORE Group

November 28 (Third Day)

8:30 Case Study #3— British Shipbuilders

Donald Macphail, Planning Manager at Govan Shipyard

10:15 Workshops

12:45 Case Study #4 — Puget Sound Naval Shipyard

Wayne Williams, Special Projects Officer

INTRODUCTION

Michael Gaffney Good morning. I'm Mike Gaffney from Cornell University, and it is my pleasure to open this workshop on Human Resource Innovation in Shipbuilding/Shiprepair. It is also my privilege to introduce to you our Chairman for this workshop who is General Manager of Human Resources for the Marine Construction Group at Bethlehem Steel Corporation. He is also Chair of the Human Resource Innovation Panel of the National Shipbuilding Research Program, Mr. Frank Long.

Frank Long Good morning and welcome to the second national workshop on Human Resource Innovations in Shipbuilding and Shiprepair. The first national workshop was conducted here at M. I.T.A.G.S. in May of 1983, sponsored by the Education and Training Panel of the Ship Production Committee of the Society of Naval Architects and Marine Engineers — the National Shipbuilding Research Program. Among my acquaintances, not very many people are familiar with the National Shipbuilding Research Program. I suspect that there are others here who are equally unfamiliar. My presentation will be a synopsis of what the Shipbuilding Research Program is and how the subject of "Human Resources" ties in with it. My material was "stolen" from Bob Schaffran. If it is inaccurate, he has some responsibility for it, and he is here to correct me.

The National Shipbuilding Research Program is a cooperative venture of the U.S. Maritime Administration, the U.S. Navy and the shipbuilding/shiprepair industry. The objective is to improve the productivity of U.S. shipyards. This is accomplished through the provision of financing and management of technical research projects. The research projects are funded jointly by MarAd and the Navy at approximately \$4 million per year in recent years. Industry's contribution is the absorption of indirect labor costs, including overhead and general and administrative costs. The National Shipbuilding Research Program provides for industry participation in the program's technical management through the Ship Production Committee (SPC) of the Society of Naval Architects and Marine Engineers. The Ship Production Committee is composed of senior technical managers from U.S. shipyards that collaborate with MarAd and the Navy in establishing program priorities, assigning responsibility for projects, and providing technical direction. Technical research panels under the Ship Production Committee are ten in number, each responsible for providing guidance and direction to projects in a specific area. Each year the panels make recommendations to the Ship Production Committee for future projects. The Ship Production Committee reviews all panel recommendations, and finalizes project recommendations to MarAd and the Navy for funding. Panel #5, Human Resource Innovation, is the newest of the research panels.

In late September, Bethlehem Steel Corporation received a contract from MarAd providing funding for research projects in the field of human resource innovation. The idea of the panel originated from several sources — the National Research Council, a blue ribbon panel of the SPC, and SP9 (Education and Training Panel), which actually examined this field under the rubric "social technology." Subsequently, although SP9 determined that social technology was not in its own charter, the panel did recommend the subject matter as deserving of industry attention.

The Ship Production Committee was thus persuaded to establish the new panel to conduct research in the area of human resource innovation. SP9 provided funds for a special human resource task force to carry the message of this new activity to industry. The task force consists of Dr. Michael Gaffney of Cornell

University and Frank Long. Michael is SP5'S program manager that is a paid position from these funds. Mine is an unpaid position. By the end of the year Michael and I will have visited on invitation 15 yards for the purpose of introducing them to human resource innovations, either in place or being tried in Japanese, Northern European, U.S. shipyards, and in other U.S. industries.

In late August of this year, SP5 held its first panel meeting — a total of 18 yards had joined the panel to date. Union representation from those yards is encouraged and anticipated. Our objective is to develop, test and diffuse new management practices and organizational forms which better tap the potential of the shipbuilding human resource.

This workshop has many sponsors: The University of Michigan, Bethlehem Steel Corporation, Cornell University, the Department of Labor, the Department of the Navy, the Maritime Administration. However, the workshop itself was produced and directed by SP5, and principally by SP5'S program manager, Dr. Gaffney. Dr. Gaffney is a graduate of the Merchant Marine Academy and has a Ph.D. in Anthropology. He's been a deck officer at sea and on the Great Lakes. He is currently on the faculty of the School of Industrial and Labor Relations at Cornell University. In addition to his duties as program manager for SP5 he is also working with American President Lines and six seafaring unions on an employee involvement/work redesign effort related to some new vessels they have acquired. Michael will be our master of ceremonies for the rest of the program.

Michael Gaffney I asked Frank not to give me any credit for the design of this workshop until we saw how it was going. Actually, the design of the two days is a creation of the Human Resource Innovation Panel (SP5) which Frank has just introduced to you. I want to point out that there are a number of SP5 members among you, and we have indicated who they are by a red dot on their name tags. So if you have any questions about SP5, these individuals can provide the answers.

Last August when the challenge to design this workshop was laid before SP5, I presented a number of alternatives. I told panel members that we could bring either a lot of Europeans and Japanese to tell us how it is done overseas, or we could focus on U.S. shipyards because there is quite a bit being done by American yards in this field of human resource innovation. I also gave them the additional choice of focusing on the employee involvement/worker participation/industrial democracy aspect of this subject matter, or on work redesign (small work teams, decentralization). Further, I asked them if they wanted the workshop to be a lecture format with information being dispensed to the audience by the experts, or a workshop format based upon a lot of interaction among the participants. The answer they gave me to these questions was "Yes." So we've tried to combine all these elements in these two days. The result is a very full schedule. Even with all of that up-front planning, the fact that we have over 100 participants representing 27 yards and 17 unions (far more than we anticipated) has forced us to improvise somewhat. We had to move from a more intimate room to this auditorium, but we will resort to breakout groups on occasion and thereby retain as much interaction and participation as possible.

I would like to briefly go over the agenda with you. After some introductory words from our sponsors, we will hear our first U.S. case study (Bethlehem Beaumont), then an overseas case study (Japan), followed by a look at what is going on in Germany, and an overview of developments throughout Northwest Europe. At the end of this afternoon, we will break out into small groups to

determine what topics you wish to focus on tomorrow. We didn't want to design the entire workshop in your absence, but thought it would be wise to let you have a hand in it as well.

Tomorrow morning we will have another U.S. case study, this time a naval shipyard (Puget Sound), followed by our second overseas case study (Govan Shipyard of Glasgow, Scotland). That afternoon we will have two breakout sessions consisting of a number of concurrent workshops addressing various topics earlier identified by you. You will have a chance to review the topic listing and pick those workshops that most interest you.

I'd like now to introduce to you Howard Bunch. Howard is the NAVSEA Professor of Ship Production in the Department of Naval Architecture & Marine Engineering, University of Michigan. He also Chairs the Education and Training Panel of the National Shipbuilding Research Program. I like to refer to Howard as the illegitimate father of the Human Resource Innovation Panel (SP5) because it was Howard and Howard's panel that decided two years ago that it might be useful for the industry to explore this subject matter of employee involvement and work redesign. Howard and his panel are responsible for the workshop and proceedings from a year and a half ago, and also provided major sponsorship of a series of mini-workshops that were presented to a number of your yards this past summer and fall, and also for this workshop.

Howard McRaven Bunch In the few minutes allotted to me I would like to describe the events leading to this meeting, and to highlight the role of the Ship Production Committee (and its Education Panel) in bringing it to come to pass.

About three years ago, the Ship Production Committee asked its Education Panel to investigate whether the SPC should expand its activities to include research toward the improvement of the effectiveness of the human resource component of shipbuilding. The SPC was aware that most overseas shipyards had different work organizations than did U.S. yards, but there was uncertainty as to how this difference actually impacted on productivity. Until then, all of the Committee's projects had been directed toward facilities and process improvements, with the exception of the Education Panel (SP9) — which had just been created.

The panel undertook the study — indeed it commissioned Dr. Gaffney to do the work. The conclusion was that there were human resource areas — other than education — where attention should be given. The Education Panel evaluated Dr. Gaffney's study, and after considerable discussion decided the next step should be a national workshop to accomplish three objectives

1. Educate the attendees as to the various concepts of human resource innovation that might be effectively introduced to shipyard environments — including both individual-oriented concepts (e.g. behavior modification), and group-oriented concepts (e.g. quality circles).
2. Determine the extent of shipyard interest in proceeding with a formal program of human resource innovation research.
3. Should industry reaction be positive, decide on the best way to proceed.

To make a long story short

- The workshop was held in May, 1983 — the Proceedings of the workshop were published, and have been a bestseller.
- The interest in human resource innovation projects was so strong that the panel decided to continue the initiative.
- The panel funded a program of mini-workshops for interested yards, and a second national workshop, which is this meeting.

It was hoped that the mini-workshops would also result in identification of coterie of persons at the various yards who would provide the basis for the establishment of a new SP panel. Indeed this group did materialize and the new panel has been formed — as many of you know. I would expect that many of you in this room are members of the new panel. Bethlehem Steel Corporation is the program sponsor, with Mr. Frank Long being the panel chairman, and Dr. M. Gaffney serving as program manager.

The Education Panel is proud to have been the sponsor (and protagonist) for establishment of the Human Resource Innovation Panel, the mini-workshops and symposia leading up to this event and to have been the main sponsor for this meeting.

The reason our panel committed about one-quarter of research resources over two years (over \$100K) to this sin program was its conviction that the area is one of the main points for potential improvement in the shipbuilding process. It was also our conviction that the first step in realizing this potential was through education at all levels in the shipyard.

On the basis of what I have seen this morning — over 100 attendees representing over 20 yards, and with both labor and management represented — I am convinced that our enthusiasm and support was well-founded.

We wish you well during your meeting. And we will see that the Proceedings are available for your use and circulation among your colleagues as quickly as possible.

Michael Gaffney Virgil Rinehart is Director, Office of Advanced Development and Technology. Virgil's responsibilities include the National Shipbuilding Research Program which has been independently judged to be one of the longest running and most successful examples of government/industry cooperation in research and development. It is through MarAd and Navy cost sharing in the National Shipbuilding Research Program that has made this workshop possible.

Virgil Rinehart I want to say what a pleasure it is to be here and to be allowed to participate in this workshop. I say this humbly because although I think this program has been very successful, and although I take pride as part of the Maritime Administration in this program; I really can't claim any part of it as my doing. I've been a sailor for many years and been in the MarAd R&D Program for over ten years, but I'm the new boy on the block as far as this program is concerned. Of course, the human resource area is the new boy on the block as a part of the National Shipbuilding Research Program.

We've talked about research and development generally dealing with something inanimate like hardware and welding development, which are some of the biggest programs within the Shipbuilding Research Program. These and other process technologies have attracted a lot of attention. Gradually, though, we recognize that management and organizations had a great deal to do with productivity in shipyards. And, as is usually the case, we belatedly realized that human resources are the heart of productivity in the industry.

The success of this program has truly been based upon an excellent but successful cooperation between various shipyards of this country. We now have cooperation between the Navy and Maritime Administration in the funding of this program. We have cooperation between government and industry which is not ordinarily found in this country. Usually we find an adversarial relationship between government and industry and that may have changed somewhat. Finally, it is based upon cooperation between management and labor.

Programs like this are forerunners of a new mood in the

country. I think it's appropriate that this seminar is held at this marvelous facility, which is really a showplace for human resource training.

I mentioned earlier that human resources are frequently the last thing that we consider when attempting to improve productivity. I'd like to refer to a book that's been getting a lot of attention in the last year or so — a book called, *In Search of Excellence*— which emphasizes that successful companies pay a lot of attention to their human resources, not just to the top 5 or 10 percent of outstanding performers and not just to the 5 percent or less of those who provide some kind of trouble for the organization, but to those 90 percent of good, solid, hard-working people, without whom the company could not function. Without this "cooperation" organizations cannot reach their potential.

Considering all the foregoing, I congratulate all of the participants here for their enlightened and farsighted attention to the importance of human resources in shipbuilding productivity. I wish you all success and hope that the spirit of cooperation demonstrated here will set an example not only for this industry but also for all America as it faces the challenges of foreign competition in the years ahead.

Michael Gaffney About one year ago, the Maritime Administration consulted with the Department of Labor concerning the formation of this new labor-management panel. Since that time, SP5 has received considerable help from Mr. Stepp and his staff especially Bill Batt. One form of assistance has taken the form of partial financing of this workshop. I should add that Mr. Stepp's portfolio at the Department of Labor has recently been upgraded to bureau status.

John Stepp The Department of Labor is happy to be in a co-sponsorship role here at this conference with the Maritime Administration, Navy, ILR School at Cornell, University of Michigan and Bethlehem Steel Corporation. I'd like to talk about the Bureau of Labor-Management Relations and Cooperative Programs. It's a new entity in the Department of Labor. We came into existence as a Bureau just a few months ago. Our mission is to sponsor and co-sponsor events such as this. We are interested in making any contribution that we can to foster a less adversarial, more positive, more cooperative kind of labor-management climate. Essentially, our role is as a catalytic agent, sponsoring and co-sponsoring such events, bringing labor and management together where they can deal with problems which are of mutual interest.

We have to date sponsored a number of events that have some similarity to this, but today is different in one respect — never have we sponsored a conference or a symposium that has been industry-specific. This is something we're involved in for the first time. We're very interested in seeing how this kind of event might come together—it could conceivably be a prototype that could be used in any number of other industries where labor and management could convene to discuss problems that they may share.

I should also say that in addition to sponsoring conferences, seminars, symposia and such events, we're trying to distribute as much information in printed form as we possibly can. Publications which we have produced to date are designed specifically for labor and management practitioners.

In closing, I hope that you will find this a profitable gathering, and I'm sure you will take with you a few new ideas. Again, on behalf of the Department of Labor, we are pleased to be a cosponsor of this event.

Michael Gaffney The New York State School of Industrial and Labor Relations has as its charge, not only the delivery of resident instruction for degree students, but also the provision of education and training opportunities to practicing union officials and managers in subject areas germane to labor—management relations. These include traditional topics as well as new issues such as employee involvement and work redesign. Lois Gray is Associate Dean for Extension at NYSSILR.

Lois Gray On behalf of Cornell, the School of Industrial and Labor Relations, I want to extend a warm welcome to all of you who are attending this important workshop. We are pleased to have the opportunity to participate in organizing and sponsoring this event, which fits so closely to the mission of the ILR School. The ILR School's function is not only to provide resident instruction, but also extension education to practitioners.

The School was established by the New York state legislature 40 years ago on the basis of extensive hearings as to what contributions the state could make to improving industrial and labor conditions. Initially, there was thought given to enacting more laws, but the consensus of the hearings was that what was needed was not more laws, but more knowledge. This led to the establishment of the ILR School at Cornell University. Over the years, the School has extended beyond the borders of New York State and has worked with other universities, such as the University of Michigan, in co-sponsoring national conferences. It has undertaken international outreach as well, bringing students and professors from abroad, and sending our own faculty abroad to offer technical assistance to other universities interested in entering this field of human resource management. The past has led to the School's current interest which is central to the theme of this conference.

About a year ago, we established a special activity of the School entitled Programs for Employment and Workplace Systems. This program offers technical assistance, education, research, and evaluation to unions and management which are engaged in analyzing their own workplace problems and attempting new solutions.

The history of union-management cooperation in this country, which has been rocky as you know, demonstrates that it really can work if several conditions are met:

1. The parties are faced with serious problems they recognize as threatening to their own survival.
2. They have a genuine commitment to doing something about these problems.
3. They see the potential for a mutual pay-off, a mutual gain, on both sides.

There is evidence of a commitment to solving these problems and there is a potential for mutual payoff. We look forward to the results of this conference as a step in the right direction.

Bethlehem Steel Corporation Beaumont Shipyard

Case Study #1

Barry Long,
Ken Smith,
G.L. "Bud" Rauwerda

Michael Gaffney A team of three will be presenting the Beaumont Shipyard case study. They are in reverse order of appearance:

"Bud" Rauwerda, a long service welder in the yard shop steward for the Boilermakers, and currently union coordinator for the yard's employee involvement initiative.

Ken Smith is Bud's management counterpart in employee involvement coordination. Ken worked for a number of years as a pipefitter, and more recently in Beaumont's Planning Department.

Barry Long is Assistant General Manager of the yard. He has been a shipbuilder for 33 years, first in his native England and then subsequently in Canada and the United States. Barry asked me to make it clear to all of you that he is in on way related to Frank Long, also of Bethlehem Steel

Barry Long Since this is a case study, I want to give you a little background about the facility that we have at Beaumont, and then tell you what we have been doing for the last 27 months in order to give you a chance to see the process we have followed, and to second-guess us.

The people in Beaumont are the finest people in the world; the workers are some of the best workers in the world. We have a long tradition of visitors coming to our shipyard — visitors from the U.S. and other parts of the world — who walk around commenting on the high proportion of our work force who are working. Many of you know that doesn't always apply, but we have a dedicated work force and for many years we have been internationally competitive.

Unlike a substantial portion of the American shipbuilding industry, our particular product, which has been mobile offshore drilling units since the late 1960s, is one that we have been selling in a world market. We have been competitive without subsidy or government intervention. This has been possible not because we have the cheapest labor; in fact, far from it. The rates we have been paying have tended to be among the highest in the United States. But we believe we have the smartest people when it comes to building ships and mobile offshore drilling units.

The shipyard in Beaumont was actually founded in 1917, and purchased by the Bethlehem Steel Corporation in 1947. During the Second World War it employed over 10,000 people — building ships and other vessels for the war effort. After the war, it continued as a shipyard but tended to build specialty vessels such as LPG barges and some of the very first offshore production towers that were used in oil exploration and development in the Gulf of Mexico. From the late 1960s to the early 1970s, we ventured into semi-submersibles and, as some of you know, that was one of the quickest ways devised for a shipyard to lose money. We were not the exception. At that time we had about 3500 people on the payroll, and after taking a long, careful look at the facility, we decided that not only were semi-submersibles not good things to build, but 3500 people were too many for the facility to operate properly. Since then, we have tried to run a facility with a payroll of about 2200 people, and we have been

successful in the last 12 or 13 years in building primarily for the offshore industry.

In Beaumont, Houston, and Southeast Texas, we have an area which is very dependent on the petrochemical industry in all its many facets — an area which is very proud of the fact that it was recession-proof. Whatever else happened through the 1960s and 1970s in the rest of the world, Beaumont, Houston and Southeast Texas still flourished.

In the spring of 1982 it was still a boom area. By the fall of 1982 it was a disaster. For the first time in history, the real facts of life came home to Southeast Texas. The local refineries and petrochemical works, many of them, cut their labor forces by more than half. We have a prevailing unemployment rate in the area at the moment of somewhere around 20 percent. We have a situation where no one has ordered an off-shore drilling unit in three years and we have no real prospects of anyone ordering another one for some considerable time into the future. So in 1982 we had to take a very hard, long look at whether we were going to survive, and how we were going to stay in business.

We were surprised to discover in 1982 that Bethlehem Steel Company had been involved in employee involvement activities at the end of the First World War back in 1918 and also during the Second World War. The things that happened then were what we might now call quality circles or problem-solving teams. There were labor-management participation efforts in both the shipyards and the steel plants of Bethlehem way back, a long time before anyone really appreciated it. But both times, once the immediate national emergency had died, the desire for cooperation died with it. During the late 1970s and into the early 1980s the corporation took a positive step to encourage labor-management participation in various forms in the steel plants. In the Sparrows Point Shipyard in Baltimore, problem-solving teams and various other aspects of employee involvement were installed during 1981-1982.

In August of '82 at Beaumont, a labor contract came up for its three-year renegotiation which was accomplished without a strike for one of the very first times in history. As part of the renegotiation we had a memorandum of understanding between management and unions whereby it was mutually agreed that at some suitable time we would get together and investigate the possibility of, and the form that could be taken by, employee involvement activities. By December of '82, as I said, the real world had come home to Southeast Texas. Our hourly-paid work force dropped to less than 50 people. You can't run an employee involvement effort with 50 hourly-paid people. We didn't even try. However, in the beginning of '83, we did get a major ship conversion project, which we're still working on, our hourly-paid work force started to increase and by March developed to several hundred people. We approached the union business agents and asked

they would now like to start implementing the memorandum of understanding, and they indicated at that time they didn't feel they were quite prepared to do so. In May of '83 we had one of our representatives visit the previous seminar that was held here at M. I.T.A.G.S. and we began to get some idea locally of what could be accomplished by employee involvement efforts.

In June, Bethlehem's Vice-President for Shipbuilding, who is Chairman of the Shipbuilders Council of America, visited our shipyard and sat down for supper with business agents of nine different unions and talked with them about the possibility of implementing a labor-management participation effort in the Beaumont yard. In September, he came back again and told them that management had decided that it was time to start moving. The response we got from the business agents was that they thought this was a fine idea. They agreed to work with us and the initial agreement made in that September was that the shipyard should investigate and hire an impartial external consultant. Since the corporation was going to pay for this consultant, the unions agreed that we should find him and then, of course, present him to them for their review and agreement.

So in November we took our next fortuitous step. The general manager of Beaumont Shipyard and I attended a meeting at Bethlehem where we were brought up to date with the corporate position regarding labor-management participation. Following that meeting, we visited the Sparrows Point Shipyard where the two of us actually attended a problem-solving team in session. We sat there while the team talked. Like a couple of flies on the wall, we watched what they did, how they did it and what they said. The session lasted only an hour, but it was an hour that was worth an incalculable amount of money because we were able to see the differences and the similarities between the theory we'd heard about and the practice that was actually happening in a real live shipyard. We were very much impressed. It seemed that the middle level of supervision and the hourly-paid people were talking openly and frankly about problems and seeking to solve them in a very objective and impartial fashion. It did a lot towards convincing the general manager at Beaumont that this was something that wasn't just pie-in-the-sky at a university. It was something that would really work out on the floor in a shipyard. Later in the same month we had the corporation screen some potential labor-management participation consultants and submit a list of three to us for evaluation. We had these candidates come to the yard and talked with them about their philosophy. We showed them the yard and they met a few people so that we could see them and they could see us.

I'd like to point out some of the more interesting aspects of the screening process. First of all, we discovered that all three of these potential consultants were a little bit frightened of shipbuilding, and their fright came out in the form of questions like "Do you really mean it? Are you really going to go through with it?" One of them was very fond of telling us that he didn't want to get involved in a "Kamikaze" effort. He was afraid we would start off with reckless enthusiasm and then the whole thing would explode and die within six months. None of them was really convinced that we were for real. Our attitude was that we would only have one chance to implement something like this in, shall we say, my lifetime. If we tried now, and failed, especially if we failed through some visible mistake on the part of management, it could be 10 or 15 years before we could have another trial. So the consultants were suspicious of us and we were a little cautious about the consultants. Were they really for real? Were we really for real?

We discovered some interesting things in interviewing these potential consultants. One was a university group, which shall be nameless, which came in and made a magnificent presentation. They were by far the most impressive of the three. They had

ideas, they had schemes, they had ways of approaching the matter. They apparently had a bottomless pit of graduate students who could be turned loose on us to do all sorts of wonderful things. But it became very obvious as we were talking to them that they were working on a project. These graduate students, many of them, were going to acquire masters or doctorate degrees from the work they did in our shipyard. They had this marvelous scheme which they were going to apply to us. If at the end of two years, three years, or five years the whole thing had fallen flat on its face and failed from our point of view, it was obvious that from their point of view it would still be a success because they would still have contributed to the sum of industrial relations knowledge and demonstrated that certain techniques did not work in a shipyard. As I say, they were the most impressive group and could well have been the cheapest financially, but we steered well clear of them. As far as we were concerned success meant the thing working success did not mean adding to the total sum of human knowledge. I apologize to the people here representing their universities, but we did not want to be a guinea pig. The story they used to tell me in England when I was a small child was that if you hang a guinea pig up by his tail, his eyes fall out, and we did not want to be the people whose eyes fell out.

The consultant we finally engaged was Dr. Peter Lazes who is associated with Cornell University. In December we expressed our interest to Dr. Lazes and he came down and spent some time looking closely at us, re-evaluating some of his first impressions, and meeting individually with representatives of each of our nine shipyard unions. It was of no value to anybody if we picked the finest consultant in the world and said to the union, "This is the man we are using. Take it or leave it." That's a short way to suicide. We, as well as Dr. Lazes, went to a lot of trouble to make sure that each of these people met with him, heard him out, and agreed separately that he was in fact the right person to work with us on this effort for a period of some years. Each of the nine unions agreed to accept him as the external consultant.

In January the Cornell team, Dr. Lazes, and several other people visited the shipyard to interview members of management and union members, to assess the readiness for a participative effort in the shipyard. And in February, as an attempt to make sure that everyone knew what was going on each step of the way, a letter was sent to every single employee briefly recapping the history. We explained that we had these people from Cornell here and that they were going to conduct hour-long individual interviews with about 20 percent of our total payroll. This letter was signed not only by our general manager, but also by the president of our Metal Trades Council, the business representative from our Pipefitters local and the representative from our Machinists' local. (The nine unions are split up into three groups Pipefitters, Machinists, and the other seven are amalgamated into this Metal Trades Council. Negotiations are normally handled by the three groups even though there are nine unions involved.) Cornell University people then came and conducted interviews with 20 percent of our labor force.

The interview candidates were more or less selected at random from the total payroll list; we had representatives interviewed from all levels in the shipyard, not just the hourly-paid employees. The survey covered our engineering department, staff support departments, and upper levels of management. In March of '84 they presented an organizational assessment, which was a report detailing, summarizing, and analyzing the results of 234 interviews which they conducted.

Ken Smith will now explain what it was that Cornell University found through these 234 interviews.

Ken Smith The purpose of this assessment, of course, was to avoid this "Kamikaze" thing that Mr. Long alluded to. We wanted

to make sure that we conducted an up-front analysis of the existing conditions in the yard. The purpose of this was to achieve the proper fit between the problems of the yard and the available options, to achieve success of the employee involvement effort. This was not just a readiness assessment we did thorough research in all levels of our company from the top to the bottom to identify the problems, and then select the proper interventions. We also wanted to determine the readiness for change in the yard, both at the management level and with the union and the employees. The last item was to allow face-to-face contact and discussion between the employees and the consultants.

Mr. Long alluded to some of the means which we used to conduct the assessment. We randomly selected from payroll records 152 hourly people, 57 production supervisors, and 25 management people to participate in structured interviews. Through the interviews we took a look at the big picture including business, economic, and technology issues, as well as new products and our bidding process. The question format was reviewed and approved by union and management prior to use. The key areas covered in the interviews, particularly with the hourly people, were cooperation between departments, cooperation within departments, how people liked their jobs, relationships with supervision, specific problems that they found in their day-to-day work including shortage of or availability of tools and materials, etc., communications up and down the line, and information sharing.

The major findings that resulted from these interviews were divided into two broad categories: positive areas and problem areas. Generally speaking, we found that the employees liked their work, and were satisfied with the level of challenge that they found in their day-to-day duties. Pay and benefits were generally acceptable, particularly among the hourly people, but we had some problems with benefits with the salary people since we had just gone through a benefit adjustment at that particular time. Generally there was good will toward other employees; salaried and hourly employees liked the people they worked with for the most part.

The problems that turned up as a result of these interviews were very interesting. Generally speaking, the employees lacked feedback about their work. Their comments, particularly among the hourly people, concerned the fact that they would go on the job during the day and do what they felt was an acceptable task, and at the end of the day there was no comment, no feedback from their supervision. They had no understanding of whether the work they were doing was appreciated or whether the quality level was acceptable. They felt that they were just a number, that they punched in in the morning and punched out at night and no one seemed to know whether they'd even been there.

The second item of concern among the employees was the limited sharing of critical information. Information such as major details of production schedules, and short-term and long-range planning, does not filter down to the hourly people. People in engineering and other facets of our business were also not receiving communications of this type. Because of this, people felt they lacked opportunities to make constructive suggestions about their work. Of course, from our analysis, and even prior to entering this assessment period, we realized that if there were problems in the yard, the people there would be aware of them and would ultimately provide the solutions to those problems. Unfortunately, most of our first line supervision including our department heads in our production department, don't seem to feel that way. When a person has a suggestion that might improve productivity or eliminate a bottleneck situation, usually the response is, "Oh, we tried that before. You get back on the job."

The fourth problem that came up was the coordination and

interaction between the departments. The hourly people feel that we have a great deal of interference rather than cooperation between departments. They have trouble getting lifts when the need material onboard ship, they have a problem getting material delivered from the warehousing facilities, and things of this type. On the TAKX Program that we are currently involved in, the employees at the time of these interviews were extremely concerned about the rework that was taking place. We had a great number of engineering changes because of our follow-on yard status and there was some time delay in the yard. The reasons the rework had to be performed were not relayed to the employees and they were highly concerned about the fact that they had to do construction work, then go back and do it again to avoid interferences. So this was not only a problem of rework but of communication. The employees were also extremely upset about the availability of tools and equipment. It seems that they were just not able to get the message to their first-line supervisor or their department heads, to provide the proper tooling at the proper time and place.

Another problem is that people feel they lack opportunities to grow on the job. This I interpret to mean that there was no clear path for upward mobility among the hourly people. They felt that they were locked into their positions, without the means to attain positions other than supervisory positions. Some people just do not wish to take the next step along the line and become a supervisor. They would prefer to get into some other field in the yard. But they have found that they do not have paths in that direction. The last item in the problem areas concerned the lack of training in supervisory techniques and in craft skills such as blueprint reading, and advanced skill training.

The results of this assessment, four general recommendations were presented by our consultants. First, they indicated that we needed to stabilize employment levels. Because of the nature of our business, or perhaps as a response to our lack of competitiveness in some markets, our business level has not been consistent lately in terms of construction orders in the yard. This has caused continuous lay-offs and re-hires. Through improved efficiency and productivity, and becoming more competitive, we could put ourselves in a position of having a larger order book and thus stabilize our employment level.

The second recommendation involved creation of work assignments so that employees are responsible for identifiable tasks. We have a habit in our trades in the yard of giving very general instructions as to what work has to be accomplished. This is a cause for re-work in many cases and the employees voice their dissatisfaction as a result of that.

The third suggestion was to create opportunities for hourly employees and managers to resolve daily problems and do more long-term planning. We have a definite lack of communication both upward and downward in our yard. As a result, the hourly people do not become heavily involved in short-term or long-term planning. These people are the ones who are on the job and they should have substantial input into the requirements for such planning. Communication is a large problem in many companies, in many shipyards, and ours is no exception.

The fourth recommendation was to improve employee access to information. Finally, it was recommended that we create a flexible work structure to respond to present economic conditions. I would prefer to leave that last item to more in-depth discussion by our consultants at a later time; however, it is representative of the conditions we have in our yard with nine unions and interferences and craft overlaps and things of this type.

Barry Long Coincidentally, we were having, for quite different purposes, an IBM Business Systems Planning Analysis of

the shipyard, which also involved interviewing a substantial number of people. The constituency for this survey interview was quite different. The IBM people were more interested in salaried people and staff people, but the most interesting feature was the remarkable similarity between two different reports produced by two organizations for two completely different purposes, interviewing two different groups of people. Many of the conclusions were the same. The initial feeling I had on reading these two reports was that if I had enough time in, I should take early retirement because obviously the yard needed a completely new management set-up.

The next stage we hit was in April. We had a management off-site where we had about 20 of our senior managers meet for three days away from the shipyard. We reviewed the progress that had been made, went through the organizational assessment in some considerable detail, and agreed on a plan of action which we thought should follow.

One of the key issues talked about at this management off-site related to the fifth recommendation the Cornell team had made. This was the one that had to do with the flexibility of labor. When you mention craft overlap in a flexible work force, you expect union people's hair to stand on end at the very thought that pipefitters might do welding and carpenters might do electrical work and this sort of business. Management was just as upset at the thought of something like this happening. The reason for this is that the people who perhaps feel most threatened when you get into employee involvement and some of these other areas are lower and middle levels of management. Upper management can take it; they've already got a secure job, so who cares? Union people, in our case at least, are genuinely trying to improve the situation in the yard and improve productivity because their jobs are at stake. The lower and middle levels of management can see these talks of employee involvement and problem-solving circles as processes which will render them unnecessary. When everyone gets together and discusses the job, figures out how to do it; and then especially if you get some cross-crafting in there, it's the lower levels of supervision who see themselves out on the street. We found that in our management off-site, the very suggestion of any sort of multi-disciplinary work group disturbed management so much that we had to postpone consideration of such matters for a little while.

After we had completed this management off-site, we sent another letter out from our general manager telling all employees what had happened. The letter reviewed the history of how we brought Cornell in, had the study, and the management off-site. We explained that we were going to set up a labor-management policy and planning committee which would have responsibilities regarding the initiation of employee involvement activities in the shipyard.

Soon after this we had a similar off-site workshop for our union people where business agents and stewards met with the Cornell team. I think our consultants enjoyed the union workshop much more than they enjoyed the management counterpart. Must have been nicer people there. In August we had the initial meeting of the Labor-Management Policy and Planning Council where nine union representatives, one from each union, and nine members of management met along with a couple of people from Cornell to plan in detail what we were going to try to do and when we were going to try to do it. As one result of this, the union president of the Metal Trades Council and the shipyard industrial relations manager were selected as co-chairmen of the Policy and Planning Council. Once again, after this meeting, we sent a letter out to all our employees co-signed by these co-chairmen, relating the general policy we intended to follow. We had decided to setup some employee involvement teams, study

action teams and a steering committee with some employee involvement specialists. We set up a schedule around the workload of the shipyard as to when it was practical to implement some of these particular innovations.

We anticipate that this Labor-Management Policy and Planning Council will meet perhaps two or three times a year for a day each time and will be the overall controlling body for the total effort. Below that is a Steering Committee with three union and three management members, the union members being one from the Metal Trades Council, one from the Pipefitters, and one from the Machinists. The chairman was elected from among their number and the employee involvement staff are also sitting in on the Steering Committee meetings in an advisory capacity. The Steering Committee's responsibility is initially to solicit and select members for the problem-solving study action teams. We're asking for people who are interested in this to volunteer and the Steering Committee will screen them for labor and for management. We're looking for 100 to 120 volunteers from our total work force of about 1,000.

The Committee will also solicit and screen the problems that may exist in the yard. We're going to ask our entire work force to identify problem areas which they think need to be tackled and the Steering Committee will assign these problems to the various teams. They will monitor the team activities and then they'll make sure that the recommendations of the teams are implemented. You can see that what's happened at this point is that management in the form of the general manager or me, has in fact handed over the control of this whole employee involvement effort to the Policy and Planning Council and the Steering Committee. There is nothing we can do to stop it unless we veto the whole thing and cut off funds, which obviously would get us into a disaster situation where something like this can not be repeated for maybe 10-15 years. So the everyday control of this thing has now gone out of the hands of top management. As far as the normal routine operation goes, it's now the Steering Committee which is running the show and reporting back to the Labor-Management Policy and Planning Council. This, of course, is an enormous step of faith for management to take. You can only take this if you really believe this is the right way to go. Now we are not in a position, as top management, where we can limit the scope or content of the program we don't have that right any more we handed it over.

Working underneath the Steering Committee are six problem-solving teams, and we anticipate these will have up to eight members each, electing a chairman from among their number, and they will be assigned problems which are departmental or between two departments. Of the eight members, if it's in the production area, we anticipate that maybe six would be hourly-paid union members and a couple would be supervision. They'll meet once a week for about two hours. We also anticipate having a study action team. The study action team will be the same size as the other teams although its make-up may be a little more varied. It will handle bigger problems, those which are of a yard-wide nature. Some problems are easily definable as belonging to the welding department or maybe a problem of communication might be between carpenters and electricians. There are problems, however, which are yard-wide, and we anticipate these going to the study action team. This study action team has a much wider range of operation in that it will now meet two hours a week as needed. And if need be, if the problem is of sufficient importance and magnitude, they will meet on a full-time basis to solve the problem, monitored of course by the Steering Committee, as stated earlier.

Those are the ground rules within which we were trying to work as we laid it out in the Labor-Management Policy and

Planning Council and communicated to the shipyard in September. The employee involvement director, who is one of the department heads, was appointed to work on a part-time basis. The two employee involvement specialists, Ken and Bud, were also appointed to work on a full-time basis. The Steering Committee was nominated and its make-up agreed to by both union and management. Both union and management accepted the employee involvement specialists, and everyone was set to work together. So in October, we sent out another letter to all our employees telling them where we were working and the names of these particular people on the Steering Committee so they could see just where we were and what was happening. We considered this business of constant letters to employees to be very important because you remember that one of these problems we had was that people didn't know what was going on. If people don't know what's going on in an employee involvement effort then you're obviously failing right from the beginning.

I've gone through fairly quickly what we've actually done in the last twenty-seven months. That's along time. It never seemed to us that we were pushing things and working too fast. We knew we were going fairly slowly but we tried all along to go slowly and deliberately and to avoid making mistakes or getting people upset. Everything you've heard so far, however, about what has happened has been from management's point of view. I'm sorry, but that's the side of the desk that I sit behind. One of our employee involvement specialists, Bud Rauwerda, has been right in the center of this, however, for quite a while. He can tell you about how the unions approached this. Can they trust us? Are we really doing the right thing? How well are they prepared to work with us?

Bud Rauwerda This is the first time in our local history that one man has represented all nine unions. It is also the first time in the sixteen years I've been there that the union and management have ever attempted to work together. When the unions were first invited to work with management, we didn't know anything about the issues — solving work problems, employee involvement teams — and any time the union doesn't know what the management wants we always say, "No." They always come back with a simpler explanation.

The meeting of July '84 turned things around for us. At that meeting the Cornell team came down and held a two-day workshop with all the union stewards and the business agents. We found out what employee involvement meant and that it didn't have anything to do with the contract. It was a team effort by both management and labor working together instead of against each other. After we explained this to the work force, 95 percent became interested in the program. The thought of working together on production problems and using the workers' ideas to help solve some of the problems had a very positive effect. We don't want to make the decisions, but we do want to help influence those who do make the decisions. There are still problems we must overcome. There is still mistrust between management and labor. There's a need to see some results from our meetings, and not just talk. But if management is sincere then the union is ready to start.

The union is interested in the employee involvement program because if it works there will be more work for the company. This means more jobs for us, more jobs for all of the men, more satisfaction and more money for all of us, I hope.

Barry Long That brings us up to the present. So where do we plan to go? In December, we will have a meeting of the Planning Council to see how far we've gone so far. We will also start some supervisory orientation sessions to make sure that all members of lower and middle management are aware of the

implications and effects of what is happening. As I said, these are the people who feel most threatened. We also have a rather unusual situation in our shipyard, whereby our first level of management, the people we call leadermen, the people who are actually supervising eight or ten mechanics, are in fact members of the bargaining unit. This may seem a little strange. Believe me, it's difficult on both sides. They have an allegiance to their union and an allegiance to management, of which they are part. They and the levels of supervisors above them feel severely threatened by this. What's going to happen when my group sits down and starts discussing how they can get materials better, how they can do the job more efficiently? What happens if they make a decision that puts me off to one side? So we are going to have this orientation session in December where we're going to try to acquaint these people with what we're trying to do and reassure them that no one is trying to eliminate them as a level of management, but that we're simply going to try to re-direct their activities and use them more efficiently, more profitably, in a more challenging fashion. We want to give them more opportunity to make decisions and assume responsibility. We will also, of course, be sending out some more of our letters and in December we're going to start soliciting volunteers for a core group of members of the teams. As I said earlier, we're anticipating obtaining and training a core of 100-120 people, and then as teams are needed in various production departments or various areas of the yard, the Steering Committee will draw suitable people from this already trained group. In other words, we will not be actually training six or eight people here, six or eight people there, six or eight people somewhere else and keeping them as a fixed team. Our actual teams will be fairly flexible in their make up and in their disposition, but they will all be drawn from this previously trained body of people.. We hope to actually accomplish this training in January of '85.

In February of '85, our Steering Committee should have received problems and prioritized them; and we hope to proceed with installing our initial six problem-solving teams and our study action team. In April of '85, we're going to have another management off-site to review where we're going and in May-October we're going to be monitoring and evaluating what's happening, where we are going, and how we are getting there. We'll also be looking for ways maybe to improve the methods and techniques that we've been following so far, after seeing what's actually happening in the various areas. This is a continuing program, of course, and we are certainly not going to stop in October of 1985. We consider this to be the beginning of a program which will continue for a good many years.

Let us be brutally frank. The reason we are investing a lot of money, effort and talent in this scheme is that we hope to work more efficiently and work smarter. If this is just going to increase our costs, it's a waste of time. The bottom line is that we want to have a happier and more contented work force but we also have to have a more efficient work force if we don't, we'll very soon find that we have no work force at all.

Over the longer term, we hope to investigate our ability to extend team training to include all shipyard employees. Obviously this is a big and expensive step to give everybody an opportunity, not just some, to sit in on these teams. We will also be looking, in the longer term, into the utility of multi-craft teams. We think there probably is a value, once we've learned how to use these initial teams, in going to teams where the crafts are deliberately mixed—where a team by design has representatives of two, three, four or five different shipyard crafts, and are turned loose on some problems. Maybe we're going to get quite different results from a team like that than we do from a team which is composed almost entirely of members of one craft. And again in the longer

term (this may well be several years down the line), we're looking at perhaps extending the single-craft to a self-governing work group concept where we can actually have a group of people on the job who will make their own decisions regarding planning, scheduling, work assignment obtaining material, and generally running the job without so much intervention from management as now. When you get down to that fifth bullet the self-governing work group concept, this is where the middle levels of supervision start running around in panic. Depending on the experience gained, we might subsequently go to multi-craft self-governing work groups, which is a very interesting concept. I think we're going to have some people talking to us later at this conference concerning this concept.

We've gone through this process fairly slowly. We haven't rushed. We've tried to ensure that if this is the one shot we're going to get, we're going to make sure it's a good one. We have, however, learned some things on the way and there are four things in particular that I'd like to highlight before we finish. The first lesson is: don't forget that you have people in engineering, staff, and support jobs who need involvement too. We found that it is very easy to gear this whole effort towards the hourly-paid bargaining unit employee in production, and forget that in our shipyard, for example, we have about 75 people in an engineering department. We have accounting, estimating, purchasing, marketing, and the various other staff and support departments. These people are just as important as the production people outside in the shipyard. We can't have a happy, efficient smoothly operating production side and chaos and confusion in engineering and some of these other areas. These people need to get involved as well. If this is employee involvement, they are employees and they need to be given just as good a share of the pie as everyone else gets.

Another thing that we touched upon is this business of looking out for the interest of lower and middle supervision because no one else is going to. When no one tells them quite enough about what's going on, middle management can feel very badly threatened. This creates the danger that they will pay only lip service to the whole concept. The boss says, "Do it." "Yes sir, I will do it." But all the time you know that their inner feeling is fear. Once you get to that stage, you are dead.

Lesson number three is this matter of communication — communication up, down, sideways. Make sure that as you're planning something like this, everyone knows what's going on. Don't spring surprises on people. We get accustomed very often in our management approach to making decisions and then simply

telling people. Here we have to tell them a lot earlier and maybe get them involved in the decision-making process. The union also gets very accustomed to taking a stand and holding fast to it. They have to get accustomed to becoming more flexible and talking to management at an earlier stage than they otherwise would.

Lastly, let me refer to the Olympic motto *Civisu, Altius, Fortius*. In the Olympics that means faster, higher, stronger. But when you're looking at something like this, you really want to cross out the first part and write "slower." One of the easiest things to do is to go too quickly. We've taken 27 months to get where we are, and perhaps we could have cut that time, but not by very much. If you rush it you may well be heading for trouble. The higher bit — well once again, don't aim too high to start with. We believe that you should crawl before you try walking, walk before you try running. It's very easy to hear of what's going on in other places in other parts of the world and try and implement that in our shipyard in six months time. That's too fast, and apart from being too fast you're probably aiming too high. There's a slow, deliberate education process that has to go on for everybody. Lastly, the *Fortiu* bit —the stronger. Yes, this will not work unless you have a lot of muscle behind it, and by that I mean you have to have the full, genuine commitment of your management and your union business agents. I pointed out that management in our yard has already had to take a step of faith and turn things over to other people to run. If we try running it ourselves, it's not going to get anywhere. We have to trust them. Both the management of the shipyard and the management of the union have to believe that we have a lot of intelligent people out there who are really going to do the best they possibly can. We have to support them to every degree possible.

One of the things that impressed us at the Sparrows Point Shipyard, when we visited the meeting they had there, was that the general manager of the shipyard attends every single problem-solving team meeting that's held. He just comes in through the door and sits there. Maybe he's there for the whole session or maybe for just a couple of minutes, but he's there and everybody knows that he's interested. You can't go into this with mental reservations, saying, "Well, we'll do it as long as," or "We'll do it until." You really have to commit to it and go for it wholeheartedly, support it wholeheartedly, and make sure everyone else does. You need as much strength and muscle behind this as possible; otherwise, you're going to fail. We're only beginners but we can tell this much, that without commitment you will fail.

Technological Changes and Worker Participation in the Japanese Shipbuilding Industry

Case Study #2

Hideaki Okamoto

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As an academician, he has served on many research institutes and committees in Japan (Ohara Institute of Social Research, Japan Industrial Training Association, Japan Institute of Scientists and Engineers, and Japan Institute of Labour). He also keeps in close contact with developments within his field overseas. He has been a visiting fellow at the London School of Economics, and at the Harvard Business School.

I should add, that Professor Okamoto's qualifications are not only academic; he has also worked as an hourly worker in steel plants in the United States and in Europe-

Introduction

The shipbuilding industry in Japan today is, as in many other countries, one of the ailing industries. It is publicly recognized as a "structurally depressed" industry. Recently, production capacity was cut radically, but it is still an overcapacitized industry relative to the prospective demands. The newly industrializing countries, the NICS, are coming up with highly efficient procedures. Competition both inside and outside of Japan is fierce. The industry has lost the prestige it had enjoyed for a long time in both labor and capital markets.

Yet, for overseas shipbuilders, the Japanese firms in the industry are likely to be for some time among the toughest competitors. The international economic relations of the industry appear to be destined to go through a phase of cooperation mixed with competition among producers. Given this, people need to share more information with each other, with much more objectivity than in the past, in order to act in knowledge. Nonetheless, there seems to have been little effort to do international comparisons for the industry.

A systematic attempt to analyze the causes of the comparatively high productivity of major yards in the shipbuilding industry would, I hypothesize, highlight the significance of socio-technical systems, rather than technical complexes. In respect to the latter, there are many yards overseas which are very similar to, or more favorably endowed than, the Japanese yards. If one looks to the past, it seems rather clear that it was not the level of major technology that mattered, per se, but the process and outcome of the technological changes, and the latter are the functions of the socio-technical system.

One way of looking at features of socio-technical systems is to focus on the system of workers' participation and the factors influencing the system. In this regard, the extent of workers' participation at the individual level is measured by the ratios of suggestions. Involvement in quality circle activities has been to date rather well known overseas. Since this fact is indisputable, I would like to offer reasons as to why this has been so, in hope of

exposing some of the significant features of the socio-economic system. Toward the end of these remarks, I hope also to identify some major strains within the system.

Employee suggestions and some general background factors

Contrary to the public image, the major firms in Japanese shipbuilding are rather well-known among experts of personnel and engineering fields for the comparatively higher ratios of employee suggestions for method improvement. At major yards 70-80% of the regular workers make suggestions through the suggestion system in a year. The take-up ratios have been generally high. Shipbuilding has been one of the "model" industries for the Japan Industrial and Vocational Training Association in its endeavor to promote suggestion systems in industry.

The shipbuilding industry has also been one of the "model" industries for the Japan Union of Scientists and Engineers (JUSE) in its campaign for quality circle activities. Its registered quality circles are operative at one-third of all the establishments with more than 100 regular employees. The ratio is high enough to attain the top position in the extent of its spread with such industries as electronic, & automobiles and steel.

The ratios of absenteeism and turnover of regular workers in this industry have been, in normal years, saliently lower than other major industries. These are only two of the several indicators of the comparatively higher commitment of workers to the work.

Some general background factors help explain such phenomena. First is that the major firms in shipbuilding have been highly prestigious in both labor and capital markets and have attracted a high quality of manpower on various levels until recently. This industry was, in pre-war years, one of the industries given priority in Japan, which has been a resource-poor country and, thus an international marketing nation. The industry was, pre-war Japan, destined to be a major breeding base for other engineering industries.

Second is that the major shipbuilding firms have been more technologically innovative. Shipbuilding was one of the very few industries with which Japan could compete in the pre-war years in the field of engineering. In the 1960s Japan became a technological leader of the world. This was in no small measure due to the fact that Japanese shipbuilding has been intensely competitive. Thus, even today, there are more than 40 firms with the annual production capacity of more than 5000 CTR aggressively competing with each other. The innovation of one is rapidly followed by others.

Third is the legacy at major firms of personnel philosophies that emphasize employee participation at various levels. The industry had a major confrontation in industrial relations back in the 1920s, after the mass layoffs that occurred following World War I. In 1918, the industry had 95,000 workers, but by 1920 the number of workers was cut to 25,000; a drastic reduction,

say the least, took place. A series of disputes occurred and eventually there was a great strike at a major center in Kobe. This was echoed by almost all the workers in the industry. The major firms were crippled by the event nearly to the point of extinction, and subsequently turned to look for the cooperation of workers and their organizations by introducing or improving the employee suggestion system and the joint consultative committees.

Fourth is the legacy of closer coordination of decisions at various levels. Prior to 1920, there had been a tendency by top management to get involved in investment decisions. The engineers make the technological decisions, each without close coordination, particularly on manpower and employment questions. Subsequently, the top board included officers in charge of personnel relations and an arrangement was made to have the voice of the joint consultative committee on production and employment relations.

Fifth is the more direct involvement of the firm in the production process and employment relations. Until the end of World War I, labor mobility was very high. The management of the production process largely depended on master contractors. Subsequently, the major yards reorganized the production process from "functional control" to what may be called "section control; the workshop having been organized by sectional units along with the production process. The firms began to engage in the training of core-workers and supervisors with more versatile skills to become the key men in the sections. Along with those, in order to secure the long-term commitment of the core-skilled workers thus trained, the category of quasi-white collar status was introduced to the production workers, as well as "permanent employment" status, the length of service graded wage scales and fringe benefits. Subsequently, this category was extended not only to those who are trained by the corporate apprenticeship schools but also to others. The trade union in the post-war years played a significant role in extending the category to cover larger portions of workers. A majority of workers at major yards are thus today the regular workers falling into this category.

Multi-skilled targeting in job design

The shipbuilding industry has been one of the skill-intensive industries. This seems to be a factor in the comparatively lower turnover rate of regular workers among manufacturing industries. This factor may also account for the relatively high records of this industry in respect to employee suggestions and quality circle activities. It must be mentioned, however, that this has not been due to the technological conditions alone. The technological conditions of this industry tended to accompany a dilution of skills until a decade ago, if the job category is held constant. Yet this industry continued to serve in the Japanese labor market as a reservoir of skilled workers for small engineering shops and also for the construction industry. In the judgement of the present speaker, this is largely due to the multi-skill targeting in job design in the past of major yards, sub-contractors included. An explanation may be in order.

The major post-war waves of technological changes in this industry may be put into three classifications. One of these involved the major shift of hull construction to the block assembly system with wide application of welding operations from the "batch-on-berth" system with its heavy reliance on the riveting operations. The second of these is the greater use of computerization in machines and control of material handling and processes. Third is the increased use of micro-technologies, with the prospect of a major shift of the hull construction method into what may be termed the flex system, which would enable a yard to produce various ships simultaneously. The effect on labor of the first and

second waves tended to be the dilution of skills, but that was counteracted with the multi-skill targeting in job design. And this seems to have prepared the industry for the third wave in terms of adaptability to change.

More specifically, the division of labor in the shipbuilding industry has gone through changes that may be seen in the following diagram.

FIGURE 1

The Changes of Division of Labor and the System of Hull Construction

Plant	Batch-on-Berth System	Block Assembly System	Flexible Mfg. System
Fabrication	(classical) (modern)		
	(shipwright) Mold Lofting Marking	Mold Lofting Marking	Marking
	(mechanics) Mechanics Shearing	Mechanics Shearing Monopol	
Hull Construction	(smith) Forging Bending	Forging Bending Pressing	Bending
	(shipwright) setting	Small unit assembling Welding	Small unit assembling
	(Setter) (Rivetter)	Medium unit assembling Welding Large unit assembling Welding On-the-berth assembling Welding	Large unit assembling On-the-berth assembling
	(shipwright) Woodworking	Woodworking Measuring	Woodworking
	Driller Rivetter Chalker Planer	Driller Rivetter Chalker Planer	Fitter

There were pressures for the greater subdivision of work in the first major wave and the early phase of the second major wave. A comprehensive survey on the impacts of technological changes in the shipbuilding industry done by the Institute of Social Sciences, Tokyo University, characterized the changes in the late 1950s and early 1960s with the catch phrase, "From the trades to the jobs." It described the tendency towards dilution of skills in a number of trades. Also, a survey by the Ministry of Labor on skill requirements in the industry done in the mid-1960s pointed out that such dilution had been the trend in this industry during the early half of the 1960s.

While the main parts of the findings of those researchers are correct, it should also be pointed out that there were in those days, that is, the later 1950s and early 1960s, at the same time, some rather salient moves in the industry toward multi-skill targeting in work design. For example, the mold lofting workers were, under the newer system, i.e., the block assembly system,

expected to be capable of doing all other jobs involved in the construction process at least at the level of satisfactory performance. Also, the assembly workers in the respective units were expected to be capable of doing at least the pre-set welding. The main parts of the welding operations were, of course, the job welders. The welders, who are located at both of the on-process workshops and at the separate workshops, were expected to have related knowledge and skills to the extent that at least five years or so of experience was seen as required to be capable of doing the job on one's own's and at least 15 years of experience for the ganger in the work team who is under the working charge hand.

Yet, there were important elements of truth in the reports of the *surveys* of Tokyo University and the Ministry of Labor. Not all the jobs were expected to require that much scope and depth. There has been a measure of deskilling for jobs like marking, shearing, bending, drilling, planning and chalking. The riveting workers were restrained either to the key jobs or to various semi-skilled jobs in shipbuilding or engineering.

The technological changes of the first and the early phase of the second major waves tended to go with greater subdivision and standardization of work. This might have had some relationship to the fact that during the later 1950s and early 1960s there was a large-scale labor migration from rural areas. Shipbuilding depended largely on the supply of manpower from labor migration.

In the later 1960s, the strains within the workshops became apparent in this and in other manufacturing industries. The labor turnover and accident rates began to increase. Attitude surveys began to show signs of alienation particularly among young

workers. The shipbuilding industry began to suffer from a labor shortage, caused in part by changes in the labor market, the demographic composition of the labor force, and production technologies.

Coupled with the acute labor shortage were rapidly rising wage rates. The wage differentials between the regular workers of major firms and the workers in the sub-contracting firms became even or slightly reversed to favor the latter, although the differentials (fringe benefits continued to be rather substantial. There was a marked increase of urban second-generation workers. Worker with 12 years of education increased markedly, while workers who were recruited in large numbers in the 1950s began to foreshadow the problems of aging.

The second wave of technological changes involved a greater computerization of work processes. Mold lofting was disappearing from the production site, and marking was substantially automated. In the assembly process, conveyors were introduced. Outfitting began to show features of assembly work with computerized storage control. Welding work changed in its method with the appearance of the newer, more automated types of welding machines.

Around the mid-1960s, major yards began to campaign for multi-skilled targeting in job design and to strengthen education and training activities to meet the problems of skill dilution and the foreshadowed aging. As for multi-skilled targeting, some yards made long range plans. An example of this may be seen in Table 1.

TABLE 1

**Multi-Skill Targeting—
Present Status and the Target After 5 Years**

Targeted New Job	Present Job	New Arrangements			Composition of Functions					
		Process	Work-place	Products	Present			After 5 yrs.		
					A	B	C	A	B	C
Marking	A Marking B Gas Shearing	0	0	0	90%	10%		50%	50%	
						100%		50%	50%	
Assembling	A Assembling B Welding	0	0	0	90%	10%		50%	50%	
					5%	95%		50%	50%	
Bending	A Pressing B Forging (X) C Forging (Y)		0	0	90%	10%		60%	20%	20%
					5%	90%	5%	20%	60%	20%
					5%	5%	90%	20%	20%	60%

As for the aging, the principle of job design for age groups years specified at some yards, as in Table 2.

TABLE 2

The Principle of Job Design For Age Groups

Age Range	Principle of Job Assignment	Type of Category	
		Assembling	Welding
19-24	1. Physically demanding type of work 2. Basics for future	Loading (including marking for preparation)	“Downward Horizontal Upward
25-44	1. Physically demanding 2. Skilled work	Setting Fixing (upward)	High Pressure Thin Materials
45-58	1. Not physically demanding 2. Skilled work 3. Job requiring experiences 4. Jobs that can be performed by all age groups	Fixing (horiz) Fixing (downward) Planering (finishing) Planering (rough) Planering (forging) Gas Shearing	Tightly to be welded portion Downward welding

This type of tabulation is rather rare, but it is indicative of the work groups in many yards and in fact in many industries in Japan. The table classifies work functions into age-based categories by designating the primary tasks done by each age cohort into three phases: youth, middle age, old age. However, a young person may be doing middle-aged work, or a middle-aged worker may be doing old-aged work in the course of the learning experience or as dictated by convenience. There is an implicit expectation that everyone will sooner or later move up the ladder to skilled work positions or into the jobs requiring experience. Workshop groups are generally keen to have newer members recruited with latent ability to move up the ladder. Unskilled work, like sweeping or cleaning the ditch, is shared by all age groups. At every age group, to the extent possible, related work experiences are encouraged, through job rotation, transfer, or temporary assistance to neighboring work. There are subtle selections of future leaders; some are encouraged to move up quicker than others, although slowly and gradually. It is important to note that this age-job status arrangement has been a long-standing tradition of the Japanese workshop groups. It has often been a basis for the multi-skill targeting on occasions of major technological changes. If skill dilution occurs, the work group often obtains newer functions to re-create the age-job status arrangement within. Multi-skill targeting in the later 1960s may thus be seen as but one manifestation of this tradition.

Career development orientation has been a conspicuous feature of the traditional Japanese workshop groups. The medieval artisan and other social groups had a work group system known as the Kumi, similar to a lodge or trade club. Compared with the trade group unit under the western European guild system, the Kumi was less restrictive of competition within and among the group. However, the Kumi had a rather radical egalitarian philosophy of education and training, a sort of neoConfucianism in that it assumed equality of genetic ability of its members and stressed the importance of the general basics respect for the aged, and organizational skills.

On-the-job training and group working

The fact that the shipbuilding industry has been generally one of the more training-conscious industries seems to be an important factor for the relatively higher commitment of workers to their work. At most major yards, the position of a senior manager in charge of education and training, who reports directly to the works manager, has been operative since around the 1920s. He has been responsible for the corporate apprentice engineering school, supervisory development, education and training for all the employees including middle management, and also for education and training services for related firms and subcontractors.

At the plant level there are several positions with education and training responsibilities. There are the “work site engineers” including the staffs of production control, quality control, maintenance, scheduling and process control. They are usually a mixed group of higher education graduates and corporate apprentice/engineering school graduates. The other significant groups are administrative staffs including personnel staff.

At the workshop level, education and training responsibility is formally designated to the foreman and working charge hand; informally, the ganger in the work team has the responsibility. A foreman’s unit normally consists of two to five units of working charge hands which is the unit of a crew of the same job cluster, as for example the crew of assemblers or the crew of welders in the case of the small unit assembling workshop.

The foremen in the shipbuilding industry have much stronger authority in production management than in other industries. A significant portion of them, though still a minority, are graduates of the corporate apprentice/engineering school. However, they are not out in a special category as skilled workers after graduation. They start their careers on equal status with the non-apprenticed recruits. It may be noted here that the graduate engineers in Japan also start near the bottom with white-collar workers who, in turn, are not separately treated from the production workers in terms of the system of status and rewards. So, the

position of foreman is attained only after long years of experience. It may be said that major firms invested a large sum of money for the development of this "keyman of the industry."

The working charge hand is the crew leader, but he is expected to perform the foreman's role as far as day-to-day affairs are concerned upon request of the foreman. Often a charge hand is expected to perform other kinds of work not only within his foreman's unit but also outside of it. They are expected to go through pre-charge hand courses and some of them go through the pre-foreman courses. The charge hand is most typically recruited from the ganger in the work team. There are informally several types of gangers in the work team and they may be broadly classified into two major categories the group leader ganger and single-master ganger. The group leader ganger coaches the other workers in a small group and the single-master ganger does work on his own rather independently. There is generally the expectation that most workers will eventually reach the status of ganger, group leader, or single master, some sooner than others. Many of the group leaders are expected to be capable of acting as the deputy charge hand in day-to-day affairs. They are expected to coordinate the work with other gangers and supervise their own group members. Not infrequently, there are in the yard the pre-ganger courses. The ganger is an informal, historically prescribed position within the work group. It may be appropriate to say that in most of the crews, it is the position to be arrived at after at least ten years of experience. It may not be too much exaggeration to say that there is, in the Japanese workshop, the tradition often years' informal apprenticeship.

The so-called Japanese style of on-the-job training takes place in the organizational settings outlined above. There are thus formal and informal arrangements for the training of workers. The basic components of the system are outlined below:

1. There is corporate basic/engineering school to develop core workers within the workshop.
2. There is initial job training at the plant level (after finishing introductory courses at the work level) which is conducted by engineers and foremen.
3. There is often "brother" coaching for a year or so, which is the coaching of senior workers.
4. There is periodic performance appraisal and assessment of job capabilities. There is also periodic self-reporting about personal goals, expectations, and assessment of the program.
5. There is often multi-skill targeting designed for individuals, formulated by foremen through consultation processes.
6. There are subsidies for the preparatory courses to procure public and intra-firm skill certificates, and also for taking correspondence courses.
7. There are often study circles to level out technical knowledge and skill through cross-fertilization, of the opportunity provided by (6.) above and for other concerns.
8. There is often a set of technical study manuals for operatives prepared for the work site engineers who at times conduct seminars according to the plan prepared by the foreman.
9. Not infrequently, one or two persons from the workshop attend the courses at the training center, on behalf of the workshop, to accumulate the knowledge and skills within the workshop.
10. The training center usually has a system of career development, consisting of the initial basic up-grading, retraining,

ability re-development and pre-ganger, pre-charge hand, pre-foreman and pre-engineer courses.

11. There is the practice of transfer and job rotation for the purpose of education and training. There is also the practice of giving helping hands to different workshops depending on the work load, which is an important occasion for multi-skilling.
12. There is a particular form of group working organized without the involvement of supervisors for the purpose of cross-fertilization (quality circles are an example).

It must be mentioned that although the said characteristics of on-the-job training and other training arrangements are rather common among larger firms and perhaps even among smaller firms, there are considerable differences in terms of the extent, the depth and the viability of the system of human resource development. It may be appropriate to say that the shipbuilding industry has been one of the more education- and training-conscious industries. During recession periods at major yards, the education and training activities tended to be strengthened rather than withdrawn. This has been, in my judgement, probably due in part to the existence of comparatively stronger trade union organization at the work or plant level with long-standing history and traditions.

Collective bargaining and consultative committees A case

In all likelihood, the critical commentators of even the most radical ideological stance in Japan would admit that there have been historically comparatively stronger trade union organization at the works or plant level in the shipbuilding industry. Labor management relations are in recent years cooperative, but this does not mean there have not been disputes or confrontation. In the 1950s and 1960s, stoppages of work often took place over the issues of rationalization, redundancy and transfers. In particular in the 1960s, the strikes for wage increases during the spring wage offensives were remarkable in terms of frequency. Industry has been the leader, together with the steel workers, in the spring wage offensive and while in most cases steel workers have succumbed to the employers' "single shot reply: the shipbuilding workers' unions have often resorted to work stoppages in order to extract a favorable offer from employers. There was even a united general strike in 1966 involving the joint actions of the two major rival unions in the industry.

Until the early 1970s there was comparatively more unrest in this industry, as is clear from the records. The shipbuilding workers' strikes, like those in other Japanese industries were typified by the repetition of 24-hour or 72-hour stoppages of work. They also carried out a ban of overtime, and partial or token strikes in which they withdrew labor for some hours during the working day or for some processes of production. These industrial actions were carried out in disciplined ways and there were no instances of wild-cat strikes. Almost all these strikes were carried out with the complete participation of the entire workforce or at least by all production workers. Upon reaching agreement, the employees would resume their cooperation in production, and they very willingly accepted overtime work in order to make up for the lost time in the delivery period or for the wages lost by the strike.

Several factors have combined to bring about the existence of the comparatively strong trade union organization at the yard level. One of these is the historical development of labor union

leadership at the yard level. There was a very active union movement in pre-war years, as was mentioned earlier. The main current of the movement was divided into four sectors 1) the ideologically moderate group represented by the Japan General Federation of Labor (Sotomei); 2) the National Socialist or patriotic trade unions 3) the Naval Arsenal Workers' Federations and 4) the ideologically left-wing factions. After the war, leaders of 1), 2), and 3) joined the ideologically moderate Japan Federation of Trade Unions (Sodomei) and exercised considerable influence in reorganizing the unions, culminating in the formation of Zosensoren (General Federation of Shipbuilding Workers' Unions). But after many years, leftist ideologies were also echoed by younger generations and they assumed control of the union at many yards and succeeded in forming a rival national federation, Zenzonsenkikai (All-Japan Shipbuilding and Machine Workers' Union). This rivalry led to ideological antagonisms in leadership at the yard level and factional struggles within corporate-wide unions. In the early 1960s, new forces within the labor unions began to emerge, newer generations with higher levels of education, who are more pragmatic and well-versed with statistics, etc., and they began to lead the spring wage offensive.

Perhaps no one would contest that the post-war trade union movement in Japan contributed much to the employment security of workers. Several times there were incidents of mass layoffs. Generally, the unions did not allow "layoffs by nomination." The "voluntary leave" system with the negotiated lump sum of sizeable redundancy pay was allowed, but even this was usually on the condition that top management take responsibility for their part (meaning that the corporate president or his equivalent should resign and go away). The unions could secure, in the 1960s and until the recent major depression in the 1970s, one of the highest wage levels among the Japanese industries for their members. The contribution to the aspects of working conditions made by the unions are well documented in the report on the quality of working life in shipbuilding made by a committee of the Japan Institute of Labor, in English, and need not be detailed here.

Since workers' participation through collective bargaining and joint consultative committees is highly significant, in my judgement, to the quality of working life and the viability of employee participation at the individual level, a description of those at a major firm may be in order. It must be stressed that collective industrial relations tend to be, in Japan's context, the important condition for the relative viability of quality circle activities.

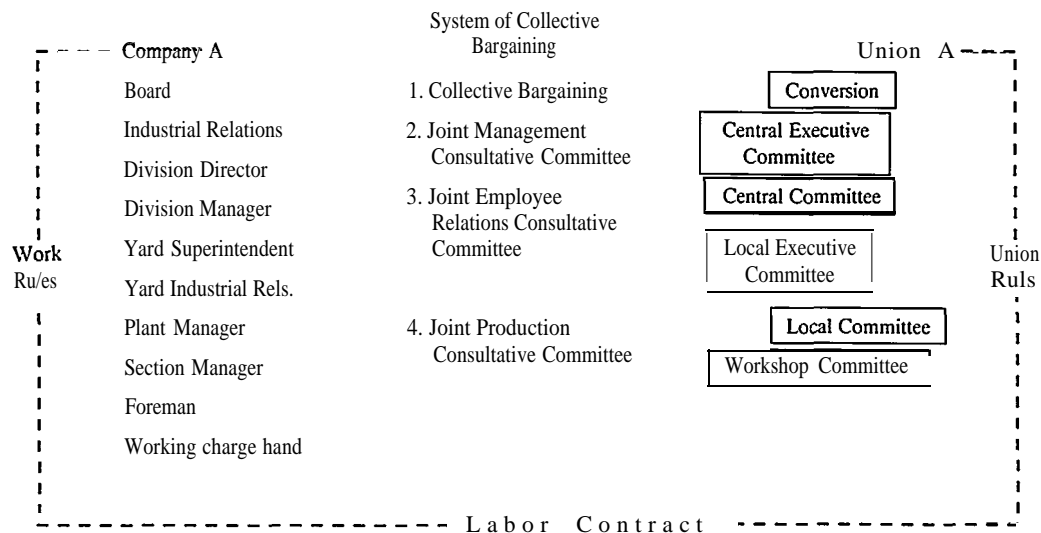
The system of collective bargaining at Firm A, which is typical of major firms in the Japanese shipbuilding industry, consists of four components 1) collective bargaining 2) a joint management consultative committee; 3) a joint production consultative committee and 4) a joint employment relations consultative committee, as shown in Figure 2.

Collective bargaining at the corporate level deals with issues such as basic wage scales, general wage increases, hours of work, the fringe benefits of retirement, paid holidays, sick pay and accident compensation, personnel problems such as recruitment, promotion and demotion, transfers, industrial safety, grievances and agreements on trade union activities. Regarding basic issues such as wages, hours and fringe benefits, the union bargains at the corporate level, that is through the national union. Negotiations at the yard level handle specific issues arising within the yard. A relatively high portion of collective efficiency pay at the yard level and the relative rapidity of technological changes have made the collective bargaining at the yard level of considerable significance. Collective bargaining at the two levels is conducted annually. The collective bargaining process is defined by the contract as the "process leading to reconciliation and adjustments over issues in which the interests of union and management are in conflict or confrontative."

Of great importance in the shipbuilding industry are the joint consultative committees on management at the corporation level, and on production at the yard. The union acts in joint consultation as the representative of employees. Items that may bear on working conditions and are originally discussed in consultation may, if no satisfactory agreement can be reached, be removed from consultation and made subject to collective bargaining. Items that are considered general managerial policies, such as the planning of production, the employment plan, the rationalization of work and efficiency of workshop organization, are submitted to joint consultation for the employer's explanation and the union's argument and proposals.

Items in the category of general management policies are specified in the labor contract as consisting of facility and equipment plans, order receiving plans, production plans, material procurement plans, financial plans, corporate financial records and the balances. There are also other items specified that are related to technological changes, including items related to organization plans. They are specified by the labor contract to include the plans for establishment or abolition of division, yard, plant,

FIGURE 2 Industrial Relations at Firm A



section, related firms, etc. By practice, the issues on manning may be subjected to collective bargaining, if consensus is not reached through consultation. The management consultative committee meets four times a year in January, April, June and November.

On the joint management consultative committee, the company is represented by the president, division directors and other senior executives and is limited to 34 persons. The union is represented by its president, central executive member and the joint management consultative committee members at yards, the number not exceeding 34 persons. Each party is responsible for providing one secretary for recording the discussion. The union annually conducts seminars and study sessions for joint management consultative committee members, usually in the autumn. They, in turn, produce draft proposals for management policies, to which the corporation has to respond at the January session of the consultative committee. It must be mentioned in this connection that the national union has as its "industry policy" a document in which conditions of the industry are analyzed from the trade union point of view and statement of policy demands to employers and their associations are made.

The joint production consultative committee at the yard level deals with, according to the labor contract, items such as 1) the implementation plan of orders and their progress; 2) improvement of the working environment 3) rationalization plans and efficiency problems; 4) personnel questions and 5) other matters as agreed upon to be dealt with by the parties. With regard to the personnel matters, the labor contract specifies in detail the reciprocal roles depending on the nature of the item. In the case of Firm A, it is mandatory for the company to consult the union before making final decisions on such items as 1) annual recruitment plan; 2) the standards of transfer of employees on occasion of larger number of transfers 3) all transfers requiring the change of residence of transferees; 4) all cases of discipline and discharge and 5) other items as agreed upon to be dealt with this way. There are matters that the company should explain to the union before the final decision and also matters that the company should notify the union of before taking action specified in the contract.

It should be noted that, as shown in Figure 2, within the company hierarchy the industrial relations functions are located at the point of critical decisions. They are represented in the

board and in positions directly reporting to the board. Also there are in positions directly reporting to the yard superintendent and plant manager. This is the same in all of the major yards in the shipbuilding industry.

Problems and prospects

Since this paper has focused on some of the social and organizational aspects that have led to the higher level of participation consciousness among workers in the shipbuilding industry, it must be noted here that the statements made did not adequately cover the shadowy aspects of the realities of worker relations in the shipbuilding industry. Some remarks on this are therefore necessary.

As was mentioned earlier, this industry in Japan is now one of the "structurally depressed" industries. There is no bright prospect for growth in volume. The wage level, which was until recently one of the highest, is now below the average. The average age of workers is rapidly going up; the problems of aging for the type of work in the industry is serious, and in addition, given the type of wage scales in Japan, aging means a rather conspicuous increase of labor cost. Young students are now rather indifferent to shipbuilding. The status of this industry in the labor market which was once prestigious, has rapidly sunk. And it is under such circumstances that pressures for large-scale rationalization are mounting. Thus the re-building of the industry into a "attractive industry" is but one possible way for survival.

For those reasons and others, worker participation at the industry and national levels is becoming an important agenda. Although machineries already exist for this — the National Shipbuilding Labor-Management Consultative Conference is one and the National Maritime and Shipbuilding Rationalization Deliberative Council is another — the need for stronger involvement in decisions in these machineries is being voiced much more strongly by unions than in the past. The industrial relations of the industry will probably involve in the not too distant future many more decisions on the mix of cooperation and competition among producers in the international arenas. I believe that exchanges on how to re-build the "attractive shipbuilding industry" are a good starting point in that direction.

Bureaucratization and Professionalism as Options in the Redesign of Shipbuilding Organizations:

Notes on the German Case

Heinz Dieter Meyer

Michael Gaffney A couple of years ago, Z ran across a book by a Michael Schumann dealing with the organizational implications of zone construction implementation within German shipyards. Thus far I have only ranslated the table of contents, but it became clear that the work would be of value to those concerned with a similar process taking place today in U.S. shipbuilding. Then, illustrative of the small world phenomenon, I recently found a graduate student at Cornell who had conducted a secondary analysis of the shipyard study by Profesor Schumann I have prevailed upon him to discuss the results of that research with us today.

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Abstract This paper distinguishes between bureaucratization and professionalism as two ways in which to orient the modernization of shipbuilding. While shipyard management initially seems to be inclined to prefer bureaucratization, evidence from the organizational design literature as well as from studies of a case of bureaucratic modernization in West German shipyards underlines the importance of professionalism and informality as a competing design option. This holds particularly if the high level of uncertainty in the shipbuilding process is taken into account.

Without special attention by management and unions, the process of modernizing shipbuilding tends to destroy informal decision-making networks among yard workers without providing substitutes of equal efficiency. Such options are, however, available. They can be found in the tradition of the craft-oriented workshop, the quality circle, and the multi-craft work team. Utilizing these forms, shipbuilders can pursue yard modernization without discarding valuable elements of traditional shipbuilding.

Introduction

During the last twenty years, shipbuilding worldwide has undergone dramatic innovation after decades of technological and organizational stagnation. Before that, technical and technological changes (riveting to welding) as well as changes in construction material (wood to iron) had only gradually changed the profile of the industry (Meyer: 6-13). Decreasing segmentation of the international market increasing competition for a shrinking demand for shipping tonnage, and few (but effective) technical innovations have dramatically changed that picture. Today, shipbuilding worldwide exhibits a profile substantially different from that of 25 years ago. However, the unique features of the shipbuilding industry, as well as its strong ties to the construction trades in general, do not allow shipbuilders to simply adopt the methods of technological modernization employed in other industries. This holds true for the process of organizational redesign as well. The shipbuilding industry had and still has to find out what is best for it on its own terms. In an industry that is traditionally not very adaptable to innovations in management

techniques, and that leans towards managerial inbreeding (Maritime Transportation Research Board 91), this is not an easy job.

Comparing the course of innovation in shipbuilding in Germany and the U. S., one of the most visible similarities is the tendency of managerial planners to adapt shipbuilding to methods of bureaucratically administered, highly standardized mass production. Analyzing a task into its component parts and task standardization through mechanization became the major operational goals of the redesign process in the German case. (Schumann: 148; 151-154). The shipbuilding industry was seen to be a late-comer in an inevitable and pervasive process of standardization and taylorization (Schumann 81). According to this view, the shipbuilding industry was ripe for a transition from the old-fashioned and obsolete craft approach to modern methods of mass-manufacturing.

This view also holds among representatives of shipbuilding innovation research in the United States. A scenario of the future of shipbuilding in the U. S., issued in 1979 by a panel of experts organized by the Maritime Transportation Research Board (quoted as "Maritime Transportation" below), depicts shipbuilding in the U.S. as heading towards deskilling and specialization of the labor force. Craftsmanship, thanks to some seemingly irreversible trends such as a decreasing supply of traditionally trained craftsmen and advancing technology (Maritime Transportation 48, 49), is treated as anachronistic and obsolete. The Board assumes that these trends are convenient for an industry on the brink of a major innovative change. Thus, "obsolete craftsmanship," rather than being taken as an alarm signal, is welcomed as a guarantee of the industry's ability to adapt successfully to a new environment. In both the German and the U.S. cases, the goal of the innovation process was the transformation of the shipyard into an assembly station (Schumann 74, Maritime Transportation: 2).

The trend toward purchase and subcontractor installation of ship components may well reduce the variety of skills required in the shipyard, at the expense of increasing the burden on engineering and middle-management personnel. . . . The heavy reliance on vendors may have a side benefit in that it places the burden of learning new ship component equipment technology upon the vendor rather than upon the shipyard. Since the pace of technological change is increasingly rapid, . . . shipyards will not be faced with the problem of maintaining an aging work force of increasingly obsolescent skills (Maritime Transportation: 99).

The argument in this paper runs counter to these mainstream plans. Based on evidence from organizational design research and on conclusions from the West German example, I offer the view that the modernization of shipbuilding will benefit from professionalizing its work force rather than specializing and segmenting the existing skills even further.

Contrary to the frequent emphasis on technological variables of organizations, the discussion in this paper starts out by accounting for some of the environmental parameters of shipbuilding.

Shipbuilding: Management Under High Uncertainty

The administration of organizations confronts considerably different conditions depending on whether it takes place in environments of high or low uncertainty (Dill 1958, Jurkovich 1974). Generally speaking, high predictability or low environmental uncertainty has been established as a precondition of the rational, bureaucratic type of organization (Weber 1947 tr.). High environmental uncertainty, on the other hand, provides stimuli for the evolution of non-bureaucratic organizational elements. Jurkovich (1974 387) describes high uncertainty environments as “complex, nonroutine, unorganized and with a high and unstable change rate,” with unstable change signifying change in situations that are “loose and erratic.” These variables connote a “type 64” environment.

Organizations confronted with a type 64 environment have major information problems, have very abstract, tentative sets of strategies, operations, and tactics and cannot execute them without expecting major alterations, have very vague coalitions that change unpredictably and are constantly redesigning decision making programs or constantly making exceptions to existing decision making programs. (392)

Scott (1981: 168-169) suggests conceptualizing environmental uncertainty along the parameters of homogeneity — heterogeneity stability — change interconnectedness — isolation organization — non-organization. The determination of shipbuilding’s relative place on such scales would be an interesting aim of further research. At this point, a few illustrations must suffice to underscore that the management of shipbuilding takes place under high uncertainty.

Uncertainty in the external environment

The critical figure for the development of the entire shipbuilding industry — the demand for new ships — is an aggregation of a large number of short- and long-term trends which vary independently from each other and provide an *unstable and erratically changing environment* for shipyard management. Apart from the influence of the business cycle, the demand for new ships hinges on such unpredictable factors as shifts in worldwide raw material consumption as it influences the demand for world sea trade. The substitution of uranium for oil marks changing demands on the capacity of sea trade that hardly can be predicted by shipyard management. Worldwide economic trends, such as a tendency towards production sharing “world products” which are composed of sub-elements from manufacturing sites from all over the world (Naisbitt, 1984 67) and thus increase the demand on sea trade capacity, have an equally important bearing on shipbuilding.

International communication trends such as high priorities on fast delivery can lead to an increasing preference for air over sea transportation.

Given that the military commands a large portion of yearly ship orders, the largely unpredictable long-term changes of the international political situation and its influence on the current defense policy are of critical importance, too.

The high heterogeneity of the external environment of shipbuilding results basically from two sources: 1) the variety of clients (government, private companies), and 2) the customization of the orders placed by these clients. Since any order entails highly specific needs of a client, the ratio of design hours/output unit is extraordinarily high in shipbuilding.

While uncertainty coming from the demand side of the environment is thus very high, the uncertainty on the supply side is not

any less significant. Due to the large variety of raw material, prefabricated parts and production equipment, suppliers for shipyards run the gamut from steel mills to furniture producers and from heavy equipment manufacturers to electronic parts dealers. The interconnectedness of these suppliers is very low, so that variations in price and supply conditions normally do not correlate. The dependence of shipyards on a large number of vendors is an element further increasing environmental complexity for shipyard management.

Uncertainty In The Internal Environment

As Dill asserts (1958: 433), the structure of the internal organization can be conceptualized as another part of management’s environment. Traditionally, uncertainty along these parameters of the environment was very low in shipyards. Craft organization provided high compartmentalization, low interdependence, and, subsequently, low coordination requirements. In effect, traditional shipbuilding was able to offset high uncertainty in the external environment by high stability in the internal environment.

The beginning of modernization with its erosion of the craft structure led to a change in the internal environment. Interdependence between various departments called for scheduling and coordination of efforts on the part of management. A new group of managers had to be added to the traditional managerial hierarchy of shipwrights and naval architects. This caused a rise in the size of the traditionally flat organizational hierarchy of the yard.

Relatively stable internal coalitions that lend predictability to the internal environment, such as the one between pipefitters and shipfitters in the German yards, were shaken up through the process of modernization, and new coalitions began to form.

Standardization Of Parts vs. Standardization Of Tasks

The modernization process was, in part, designed to offset increasing uncertainty by means of standardizing the shipbuilding process. However, it can be concluded from the German example that standardization was limited to the realm of parts (metal components of all sorts). The standardization of tasks, which solely connotes methods of bureaucratic “scientific management”, was confined to those few points in the yard where those parts could be produced in large series. This was the case in preassembly departments (Schumann: 118-120) and at some points where pipe elements could be prefabricated in large series. The number of workers involved in these jobs remained small throughout the whole process. Even with welding robots the portion of tasks that could be standardized, relative to the number of remaining tasks, was small. The largest number of employees remained assigned to assembling and pre-outfitting activities which require flexible assembly teams in multi-craft groups (Schumann: 81).

In conclusion, we note that unlike organizations that may temporarily or seasonally be exposed to extremes of environmental uncertainty — as may be the case for organizations in novel markets (such as information processing) or in periods of changing supply/demand ratios (such as the steel industry) — shipbuilding *structural/v* confronts high uncertainty.

Zone Construction in West German Yards — A Case of Bureaucratic Modernization

The following is a representation of features of the German workforce as they appear in an extensive interview study of yard

workers' attitudes towards the effects of introducing zone construction, pre-outfitting and other methods of modern shipbuilding in German yards (Schumann, et. al. 1981).**

This study provides, in parts, striking evidence for 1) the existence of professional standards among yard workers, 2) the functionality of informal decision making in shipbuilding, and 3) the importance of communicative flexibility. It also demonstrates how the negative effects brought about by the elimination of these standards by a technologically-minded management have removed old forms of production without providing for modern functional equivalents. The extent of informal worker control over the production process in the German yards becomes visible through the example of the workers' method of compensation and time control. Yet it should also emerge from the quoted documents that these methods were not unambiguously detrimental to overall yard effectiveness.

Existence Of Professional Standards Shipyard Workers

One important result of the German study was to uncover the existence of a large set of professional standards and norms among yard workers. These standards served as guidelines for workers' self-control and self-direction in lieu of close supervision and control (Schumann 329). They were, however, violated through the process of introducing zone construction.

Thus, one pipefitter describes his anger with a management unappreciative of his professional abilities and inclinations

They really can make you feel stupid. You are aware because you know from the planning process . . . that certain parts are needed. But then the shipwright comes along or he may have an order from above. And he goes, "This is junk, we don't need it." A day later they come and ask, "Didn't you have this particular part?" "Yes," I say, "it was there yesterday, you disposed of it." — This is what it's really like around here. (329)***

At the core of the professional conduct of many of the yard workers are standards about technical precision and quality which the workers more and more frequently, find they are forced to violate in the course of the technological transition

Today you are allowed to put connecting pieces on in a right angle. We didn't do that formerly. We would use a saddle piece if it had to get on straight. In order to have it flow with the stream. Today they simply put it on slanting. . . . Today, you can do this . . . Believe me, we don't like that around here. But these days it's a rule. (330)

Instances such as these lead workers to perceive management as uninterested and unwilling to cooperate with the work force

You can't really cooperate with them. First, they don't want it and then, if you have to endure this kind of nonsense . . . You can tell them what you want, but you've got no right. Even if it's wrong. They do it their way . . . (329)

With their professional self-esteem frustrated, workers report withdrawing from their earlier practice of bringing production frictions to management attention and instead use the problems as an opportunity to take breaks.

Informal decision making

Any decision that a worker can carry out based on "built-in" rules and professional standards reduces the decision making weight on management and lends considerable flexibility to an organization.

Organizations, by their very nature as units of collective rational

decision making, exhibit however, a tendency towards formalizing the decision-making process. The existence of an "informal organization" (Roethlisberger 1939) thus was a significant discovery in industrial relations research. Since then, students of organizational behavior have begun to study seriously the benign effects of informality on organizational life beyond the stimulation of individual emotional well-being of members (Tichy 1973). Recently, proposals have been made that aim toward directing and creating informal networks in organizations (Krackard/Stern 1985).

The survey of workers' comments on the shipbuilding process yielded considerable evidence of the functional importance of this informal network

Sometimes we've got tasks that would require six men although they are laid out [by management] for two . . . We coordinate that among ourselves so that a couple of guys join in because it's too difficult otherwise . . . It's not as stressing as with two and it's faster. Whether you fix something heavy under the ceiling with four guys or with two . . . (384)

One source of the strength of informal networks seems to be that workers are forced to learn from their own mistakes — a learning experience much more forceful than mere abstract instruction.

. . .of course, sometimes one would get stuck at one point. I would come with the pipeline from this side, my colleague from the other and there would be a mismatch. But this would happen only once. Next time I would talk to him first so it wouldn't happen again. (333)

Instances in which management tries to interfere with particular patterns of this informal decision-making process demonstrate its problematic nature

We always divided up our work ourselves. Once, they tried to dictate it. But they couldn't do that with us and had to leave us alone. For example, we don't run only one program but three, four or five. Then we are able to work on their [the metal sheets'] shapes better and can utilize the machine more effectively. Whereas, if we run every single program separately we've got to adjust the machine more frequently and exhaust ourselves much more. (385)

Sudden material shortages, planning errors, or unavailability of technical aid such as a crane are not unusual phenomena in a high uncertainty environment. The informal decision-making network among workers provided an efficient way to cope with these events by instant and informal problem solving. Often this method of problem solving implied deviation from an official practice, yet it was for the good of the organization.

If, say, we would run out of one type of pipes — say 5 mm, which happens today, too — we were able to take the 3.6 mm because we knew the pipe system and that it would be good enough. (334)

After the implementation of zone construction, with its huge administrative build-up, this kind of "solving a problem while it is small" was made difficult by a growing number of management interventions

The kind of work I've got has changed because everything we do is administered by the planners. The element is planned, we complete it and then it goes aboard. If it doesn't fit — I won't see it again. Those people aboard fix it.— Formerly, I knew what I was doing, say, which pipeline system it was.

Another pipefitter contrasts decision making and the scope of executive discretion left to the worker under the "old" and the

“new” system, that is, before and after introduction of zone construction

Formerly, a pipefitter was most of all relying on his own initiative. This new blueprint system — we didn’t have that then. Practically, every shipwright had his own “yard.” He gave the orders and that’s how it was done. Thus, much [decision making] was left to us. For example, we would get a certain type of pipe. If I had to ask the foreman or the shipwright every time — that pipeline would never be finished. So you see, that much [of the end result] depended on self-responsibility and our own initiative. (333)

Communicative Flexibility

Research on efficiency and effectiveness of communication arrangements in organizations indicates that different tasks require different communication configurations (Bavelas 1959). The contingency notion in organizational theory (Galbraith 1971) implies that, rather than restricting a given work group to one, presumably most appropriate configuration, an arrangement which allows for communicative flexibility, can yield better results. The redesign decisions carried out by the German yards, however, started a process heading in the opposite direction. Instead of preserving flexibility, it limited communication options.

Introducing and implementing zone construction required the two German shipyards surveyed in the study to establish large computerized planning and forecasting routines. Traditionally, the planning process in shipbuilding had revolved around the three separate crafts of pipefitting, shipfitting and riveting/welding. Each craft was headed by a shipwright who directed the planning process in accord with his journeymen. Unit construction, in requiring the integration of these separate crafts, called for a formalized, computer-based planning procedure, operated by a large number of newly hired, computer-trained employees who were, naturally, unfamiliar with shipbuilding. Large parts of the communication process that previously were handled informally by workers now occurred via computer printouts and blueprints (Schumann: 338). However, these new means of communication could hardly fully replace the previous informal and more flexible communication routines:

Formerly, when a piece [of metal] was done it would, say, go to the welder. Then you could talk to him and could tell him you’d like it this way or the other. You can’t do that anymore today. —Or you would go to the mechanical engineer and you could tell him to make this a little more slanted. Today that’s impossible. They lump it together and when it comes aboard, then, say, 50% of it is wrong and we have to modify it. (330)

Though this “old” informal communication system certainly could not be preserved in its existing form throughout the transition, management again proved insensitive by failing to take counter-balancing actions which could make up for the loss in communicative flexibility.

Formerly, the shipwright had to be aboard, too. Once or twice a week one would meet him and, going aboard, there was a chance for a chat. Certainly, one can go in and see him today. But still, it’s not the way it used to be.

Compensation And Time Control

Possibly the most striking and impressive evidence revealing the scope and functional importance of an informal worker network was the study’s discovery of the existence of an unofficial system of “stockpiling hours” for purposes of workers’ compensation and time control (Schumann: 378–82) — a system which

closely resembles the routine of stockpiling relays evolved by the bankwiring workers in Hawthorne’s GE plant (Roethlisberger 1939).

To understand this, one has to know that the two yards, as all the other German yards, used a piece rate system prior to the introduction of zone construction. Under this system, any job assignment passed down to a worker or group of workers was accompanied by a time assignment, consisting of management’s binding estimate of the time-value of the task at hand. The sum of those assigned “hours” was the basis for the monthly wage of individual workers. These official time assignments, however, frequently deviated from the actual time needed to complete the job. In some instances the difference was in favor of the workers, in some not.

Rather than arguing with the personnel department about the established time value of any given assignment, the yard workers throughout the yards evolved a method of “stockpiling hours.” This meant that hours were saved by finishing a task early in an unofficial reserve called the “bank.” From this informal account these “hours” could be recalled and used any time a job could not be completed in the allotted time.

Yes, of course, we have a bank. You’ve got to have that, a day or two. You cannot go for every little thing, ‘Hey, foreman, you’ve got to write those minutes or so.’ That’s impossible. (382)

This unofficial system of compensation control provided yard workers with considerable discretion regarding the actual work flow and the pace of their job performance. In effect, it served to buffer the workers’ labor input from the official managerial requirements and to smooth out any differences between the two.

We can work into the bank and the shipwright, he would say that we have so many hours and that we can go slower. Or we fall behind, we have to speed up. We are able to control the work a little by ourselves.— We stay a little in charge, I mean, we have to work, of course, but we are able to organize it a little as we see fit. (381)

Impact of Job Training On Professionalism

It should be mentioned that professional standards and informal decision making were reported in decreasing frequency as the skill and training level of the workers decreased. This finding suggests that professional standards in the trades are closely associated with the specific socialization process provided by apprenticeship programs, which were obligatory for any “qualified worker” (Facharbeiter), such as pipefitters and shipfitters, but unavailable and, in this form also unsuited, for welders. In addition, it should be noted that the availability of these standards obviously depends on their being reinforced through the daily working routine — an aspect that may explain the lower degree of professionalism of shipfitters relative to pipefitters (Schumann: 342–43, 351). The former, although subjected to a similar apprentice training routine, are generally exposed to physically more demanding and often less skilled work. At any rate, this finding raises questions about suitable training and socialization programs for yard workers in modern shipbuilding organizations.

Professionalism: A Viable Alternative to Bureaucratization

Among organizational analysts the notion prevails that there is no one best way to manage organizations, but that managers must choose from a variety of different options, with the choice depending on a number of environmental and other parameters

(Galbraith 1973, Perrow 1979). The mutual substitutability of bureaucracy and professionalism as options of organizational administration has been one of the prominent fields of research in this contingency tradition. A large number of research findings can be called upon that lend support to the theory that professionalism is a viable alternative to the rational bureaucratic administration of organizations (Blau et. al. 1966, Blau 1968, Hall 1968), particularly under conditions of high environmental uncertainty (Heydebrand 1973).

Unfortunately, the concept of professionalism has been widely equated with white collar occupations, thus precluding its application to manual labor occupations such as those in the shipbuilding or construction industries. This conventional association of white collar occupations with the concept of "professionalism" is readily understood. Self-directedness and a coherent occupational culture are most easily associated with the kind of work to be found in complex white collar jobs. The Western European and Japanese tradition of guilds and the journeyman system show, however, that, at least initially, professionalism doesn't necessarily preclude manual labor. Stinchcombe, in an early comparative study of bureaucratic and craft administration in the construction industry (Stinchcombe 1959), takes one of the rare exceptions to these misleading generalizations. He asserts that "administration in the construction industry depends upon a highly professionalized manual labor force" (168). In particular, he emphasizes the preferability of professional or "craft" administration over bureaucratic administration under conditions of high economic uncertainty

... we maintain that the main alternative to professional socialization of workers is communicating work decisions and standards through an administrative apparatus. But such an apparatus requires stable and finely adjusted communication channels. It is dependent on the continuous functioning of administrators in official statuses. Such continuous functioning is uneconomical in construction work because of the instability in the volume and product mix and the geographical distribution of the work. Consequently, the control of pace, manual skill, and effective operative decision . . . is more economical if left to professionally maintained occupational standards. (169)

Particularly the construction industry, to which shipbuilding is very similar (Maritime Transportation 52, 63), appears to be a site of traditional "blue collar professionalism" — largely independent of changing trends in management style.

In recent years the issue of professionalism in organizations operating under high uncertainty has attracted renewed research interest and supplied a number of bestselling authors of popular management literature with a considerable stock of ideas (Peters/Waterman 1984).

This, by itself, should provide sufficient cause for shipyard managers to survey existing human resources in order to determine how much and what kind of professionalism currently exists within the shipbuilding work force. However, this doesn't seem to be the natural course of events, if the German case of technological and organizational redesign is characteristic.

Organizational design options workshop, quality circles, multi-skill work teams

Research on organizational design has shown that managers who want to encourage professionalism can choose from a number of different organizational forms. The traditional "job shop" (Werkstatt) approach that existed in German yards was certainly one option — the job shop being defined as the unit of

data projection, data transfer or task design, and task execution. Contingent factors within this system were a low degree of bureaucratization of planning and design and a high degree of professional socialization of the work force through high quality apprenticeship programs.

Japanese quality circles seem to fulfill a lot of similar functions in technologically more advanced production processes (Cole 1978).

Finally, multi-skill or multi-craft work teams that are recommended to U.S. shipbuilders (U.S. Department of Transportation 1983) may serve a similar purpose in cases where a long-standing tradition of craftsmanship is not available.

By experimenting with any one of these designs, yards may recognize the beneficial import of professionalism on organizational effectiveness and come to a suitable application of professionalism in the modernization of shipbuilding organizations.

Conclusion and Further Research

This paper discussed contingencies of management strategy and decision-making processes in shipbuilding. Unlike the tendency to credit technological innovations with a superior influence on organizational effectiveness, this paper noted the existence of two competing options for organizational design — professionalism and bureaucratization — and discussed their respective influence on overall organizational performance. On the premise that shipbuilding is conducted in a high uncertainty environment, the paper concludes that professionalization is more desirable option. Shipbuilding managers considering the professionalism model are encouraged to

- 1) re-evaluate existing craft structures for the benefits of professionalism, rather than consider them only as anachronisms,
- 2) provide training and socialization programs for the work force that stress participation and self-directed problem solving,
- 3) examine the redetinition/expansion of narrow craft jurisdiction. This is particularly relevant for American shipbuilding where craft lines are so narrowly drawn. The German example shows that redefining craft boundaries is an activity where both management and labor can win.

Within the suggested conceptual framework, the Japanese example of shipbuilding modernization would be an interesting subject of further research. To what extent does it qualify as an example of the "professionalism" option described above? How important are participative elements of organizational design in Japan, such as quality circles and particular occupational norms? Does zone construction in Japanese yards entail a bureaucratization of the work force?

Finally, what was the effect of Japanese management's attempts to decrease environmental uncertainty on the overall increase of shipyard productivity, particularly by marketing strategies?

**The study is based on an extensive interview survey of shipyard workers conducted from 1976 to 1978 in two of the five major West German shipyards. Of the 134 open-ended, semi-structured interviews, 41 were conducted with pipefitters, 42 shipfitters, and 51 welders (Schumann: 43).

***Interview selections translated from the Germans by the author. All numbers in parentheses refer to Schumann 1982.

Technological And Organizational Change In European Shipbuilding

Peter Lazes

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I'm glad to be with you again. It's been two years since I participated in the first workshop on this topic, and at that time I believe we had eight yards and one union in attendance. Considering the size of this group, the subject of organizational change must certainly be of interest to American shipbuilders, and much credit for bringing the various parties together must go to Frank, Howard, and Mike.

John Stepp mentioned this morning that this workshop, and the SP5 Panel, constitute one of the first cases of "industry-specific" sharing of workplace change information. I don't think that this is an accident. I think it reflects the fact that the shipbuilding industry in this country is in jeopardy, and must change rapidly in order to survive.

I am not presenting myself today as an expert on European shipbuilding, because I spent only three weeks there on my recent tour. But I do want to share with you what I observed in Sweden, Norway, Holland, and England. I visited seven yards and eleven work research institutes. Rather than give you a generalized trip report, I think it would be more useful if I highlight specific changes that relate to the sort of innovations that have been and will be discussed in this workshop.

Let me start with a personal vignette that came to mind as I was preparing my remarks for this workshop. When my son, Andy, was four years old he produced a piece of artwork while visiting my in-laws that generated a lot of analysis by my mother-in-law. She was very impressed by Andy's painting and searched deeply for the meaning and significance that she was sure was contained therein. Being the proud parent, I joined her in this exercise in art criticism. Not being in complete agreement as to what the artist was trying to say, we finally turned to Andy for his view of the meaning of the piece. He replied, "Paints, can't you see? It's paints."

In the same vein, the subject we are dealing with today probably has received a lot more analysis than might be considered warranted by those who are closest to it. Much of it is simple common sense. Getting people closest to the work involved in decision making relating to that work is an obviously sensible and rational thing to do. And most people have considerable responsibilities and decision-making latitude in their daily lives. Yet when those same people walk through the gates to a factory or shipyard, the flow of information slows and decision-making authority becomes constrained. The adults that enter the plant are treated as children.

Regarding this same paradox of the obvious also being sophisticated, I recall my discussion with two prominent researchers at the Stockholm Work Research Institute. The subject was not just innovation in Swedish shipyards, but in workplaces generally. I was sharing with them the contents of the Proceedings of the first U.S. workshop on this subject held two years ago. One of them turned to me and said, "You know, Peter, that is what we (the Swedes) did fifteen years ago". The point he was making was that employee involvement and self-managing small work teams were old hat to them, and not even considered innovative any longer. What I found out in my travels, however, is that these concepts may have been "old news" to the researchers, but that for the most part they had not been widely instituted throughout Europe, even in Scandinavia.

So let me proceed with some description of structural changes that I saw on my visit. I hasten to add this caveat these innovations are not appropriate for all varieties of shipbuilding or shiprepair activities, nor may they all be transferable to the U.S. shipbuilding environment. There are certainly lessons to be learned, but they have to be carefully gleaned.

I also want to point out some other supporting activities (such as management development and coaching) were occasionally significant in their absence. In our action research at Cornell, we are finding that it is not enough only to help management learn what to do, it is also important to work with them in developing structures and training programs that will sustain change over time.

I also want to discuss the role of unions in these change processes. Throughout Europe it varies from yard to yard. There is no standard arrangement.

Additionally, I will talk a bit about skilled trades training, and also about the new roles of supervisors and union officials.

Again, what I am giving you today are only "snapshots" of what is taking place overseas. Perhaps it will stimulate some of you to make the trip so that you can see for yourselves what works and what doesn't.

Let me begin by being very clear on the definition of a few terms:

"Multi-skilled"

—Descriptive of an employee who is capable of performing a number of technical tasks broader than those traditionally performed by a single individual.

"Multi-craft"

—Descriptive of a work group composed of more than one trade or craft. Multi-craft work groups are formed of workers whose capabilities and work practices allow them occasionally to assist in trades other than their own, but they are not "multi-skilled" as defined above.

"Self-managing"

—Descriptive of a work group (multi-skilled or multi-craft) in which primary responsibility for budget, quality, supervision, coordination, and work process improvements (problem solving) is resident within the group itself, rather than provided by external staff functions.

I am going to focus on developments in three European yards, The Arendal Yard of Swedyard, Clyde Dock Engineering in Glasgow, and I.H.C. Smit Yard Holland. These developments are best appreciated in light of what has been going on in work reform throughout Europe in the last 20–25 years, particularly in Scandinavia. Generally known under the heading of “industrial democracy: these reforms have to do with legislated requirements for involvement of workers and/or their representatives in shopfloor and highest level decision making within firms. The largest companies are most affected by these work reform laws, and that certainly includes the major shipyards. The point is that these workplace changes in Europe are the product of widespread and deeply rooted political and cultural concerns for the participation of workers in industrial decision making.

That certainly has not been the case for the United States where there is no political or cultural groundswell for industrial democracy. Actually, in this country we have seen a significant shift in the last decade from concern for job satisfaction (which I continue to think is an important issue) to a concern for economic survival. That is why the expression “quality of work life” (QWL), used frequently during the ’70s to refer to changes of this nature, is seldom employed any longer. “QWL” just doesn’t capture the urgency or economic necessity for change in the 1980s.

When I spoke to the Scandinavians about the economic or survival value of workplace changes, they found it difficult to respond, as their orientation continues to be framed by this socio-political perspective of empowering the workers.

Let me focus first on the Arendal Yard of Swedyard. The facility was built in 1963, and by 1977 employment was nearly 4000. By 1982, employment levels had dropped to about 3500. The yard concentrated initially on bulk carriers and reefer ships, but in the early ’70s was restructured to correspond to a more varied product mix.

The central element to this restructuring was in the shift from a functional or system orientation to that of a product or project orientation. A project leader would be assigned responsibility for a defined work package, and this individual would oversee all the crafts working on that particular unit or module of a ship or rig under construction. This particular yard, Arendal, did not employ multi-skilled workers in the small work teams supervised by these project leaders. These work teams were, however, multi-craft. The yard told me that they recruited these project leaders, and other managers, not from the traditional shipbuilding crafts, but from the construction industry. Even though these people had no previous experience in shipbuilding, it was felt that this deficiency was more than offset by their experience in coordinating and supervising the simultaneous activities of a number of crafts.

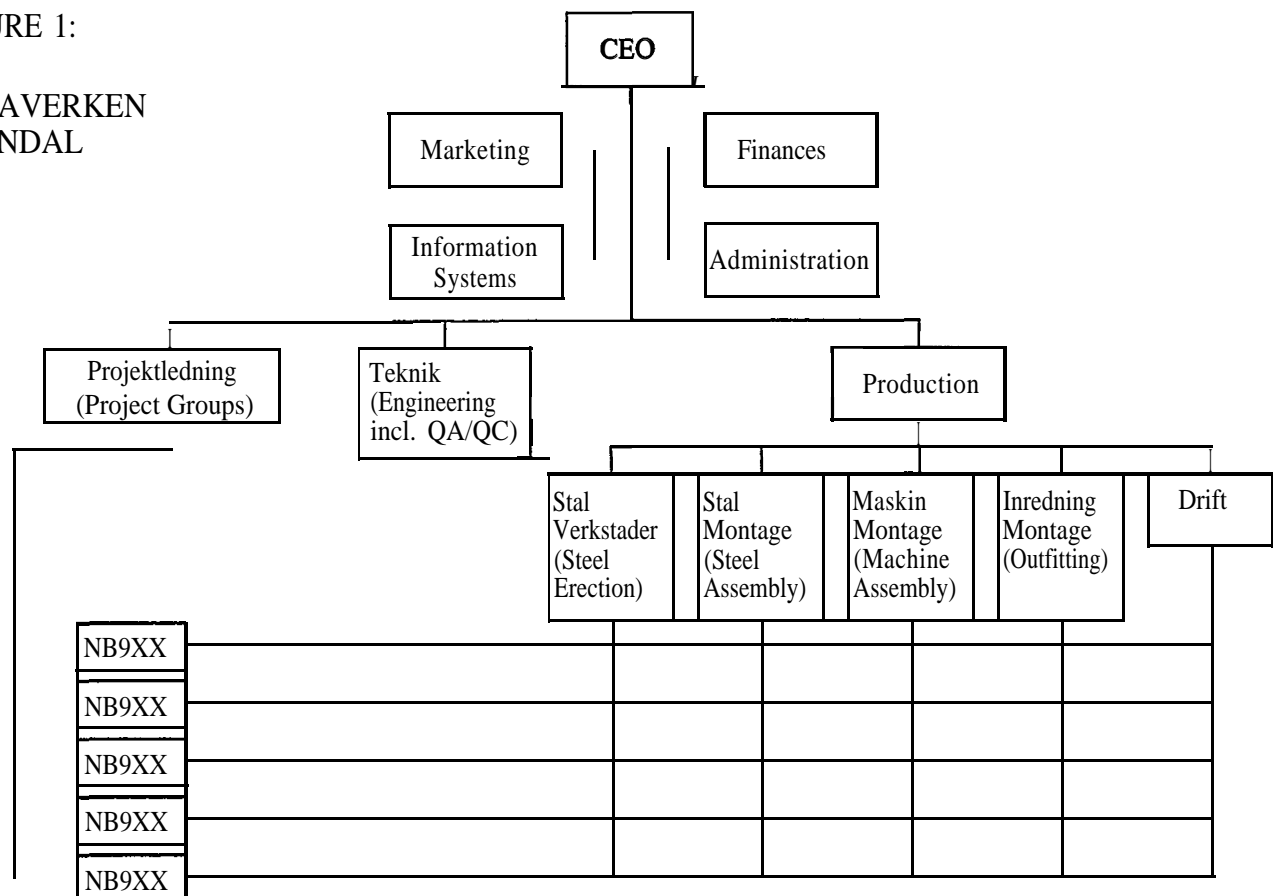
The multi-craft small work teams (composed of from 10 to 50 individuals) are largely self-managing in that they have responsibility for dimensional control and budgetary control for their work packages.

Products and engineering at Arendal have been standardized as much as the market will permit. The project orientation is facilitated by standardization but does not absolutely require it.

There has been no large-scale training effort associated with this shift of orientation at Arendal. The workers are still working largely within their established trades, and, as I stated earlier, much of the management was recruited from outside the shipbuilding industry. It is felt that the cohesive nature of the community from which the work force draws, and the example shown by the newly recruited managers, would be sufficient to accomplish the shift in a reasonable period of time without a costly training program.

FIGURE 1:

GOTAVERKEN
ARENDAL



Questioner At Arendal, is the worker's primary loyalty to his project group, or to his craft?

Peter I would say that primary loyalty is still to the project work group. If there is a conflict between craft and project management I believe it is resolved according to the nature of the argument. If it is a technical question, the craft manager will prevail. If it is a matter of schedule, or coordination, the project leader will prevail. The key is that production workers are assigned to work in groups to do specific fabrication work as a welder, ship fitter, pipe fitter. The emphasis is on getting each unit completed.

Questioned Peter, I think it is important to stress that budgets, normally the concern of craft department heads and ship superintendents, are now the concern of small work teams and project leaders.

Peter: The responsibilities of craft department managers is no longer mere production budgets. Their responsibility is primarily found in the training of their employees, to make sure they have needed equipment and material, and to assist them in solving technical problems.

Questioned Is any effort being made to make the project group stable across projects (from one work package to the next)?

Peter: They try to accomplish this as best they can, but they don't allow continuity of association within the groups to result in idle time, which could result if the contents of, or schedules within, work packages were quite dissimilar. I should also point out that the physical layout of the yard is such that process lanes facilitated the stepwise accomplishment of work packages in very neat order.

Questioned Your description brings to mind one U.S. yard that makes use of an arrangement somewhat similar to Arendal's project orientation. Ingalls calls this approach "stationization."

LC. Schmidt Shipyard's current specialty is dredges. Employment in 1979 was 2500, it is now down to 1500. Since 1982 the yard has employed consultants to assist them in a change effort that has involved production, management and, to some extent, the trade union council of the Netherlands.

At Schmidt they have introduced change in one segment of the operation, rather than throughout the yard. Their experimental area, so to speak, is the machine shop. The innovation has to do with the introduction of self-managing small work teams in the machine shop. They employ no first line supervisors in this area, the hourly workers perform supervisory functions themselves. Such work groups range in size from 10 to 14 individuals.

The payment system has been modified as well. There is now in place a "pay-for-knowledge" arrangement which translates into three levels of compensation for hourly employees. The two higher level wages are available for those employees who wish to become multi-skilled, or who wish to take on team leadership responsibilities. Opportunities for greater job responsibilities are strictly voluntary, and the yard has had no shortage of volunteers, even for the leadership positions.

There has also been some revision of terminology at I.C. Schmidt. "Production Bosses" are now called "Production Coordinators". These coordination function in much the same fashion as the project leaders at Arendal. They are responsible for the provision of tools, material, and training for the group members.

The process of change thus far has been driven largely by the production manager and top management (in consultation with the labor council). The plan for expansion of the system calls for involvement of a larger group of management and hourly employees.

The results have been quite dramatic. Since the introduction of the self-managing small work teams in 1982, productivity has improved 60%.

The last yard I would like to discuss today is Clyde Dock Engineering a small repair yard on the river Clyde in Glasgow. The yard has only 175 employees, 150 of which are hourly and 25 management/clerical. All 175 have guaranteed employment.

The yard was closed in 1977, and re-opened in 1981 when the current general manager arranged for new financing. When the yard re-opened, a very different operating philosophy was established based on employee involvement and work redesign. For Clyde Dock Engineering, work redesign took the form of multi-skilled work groups. This was the first instance of such an arrangement in U.K. shipbuilding or shiprepair, and the general manager recalls that it was an idea whose time had come.

"It was obvious, the need for changes. Anyone who has worked in a shipyard knows there needs to be cooperation between the crafts and we had to set up a process to do it. The craft lines that we had before just didn't work."

Prior to the re-opening, this general manager spent 3-4 months, 15 hours a day, with the management team to prepare them for operation under a multi-skilled work group system. The change was so substantial that it could not just be "wished" in. It was important that the entire management team was supportive of the change. Once the management team understood the new operating principle, they developed procedures manuals to clarify the new procedures and system. From my own experience, I can attest to the importance of embedding of change within the entire organization especially the critical need to involve the management team. It takes a highly involved and visible CEO, as well as commitment from managers and union leaders to make it happen.

I think Clyde Dock's philosophy towards multi-skilling deserves close attention, so I'll quote Burt Ellison, their CEO at length:

"You can't be ridiculous about multi-skilled work groups. You're talking about the blending of skills, not the wholesale retraining of the entire workforce. You are crazy if you take a highly skilled pipefitter and a highly skilled welder and train them to do each other's trade. You want to have some tradesmen able to assist others in different trades, but you don't want to go overboard. I try not to be brutal about the need for change. The perspective of creating flexibility is to get coordination and flexible work routines. It was hard for some of the managers to understand this concept in the beginning. Flexibility is critical in getting more quality work done and cutting down on waiting time. You can't be ridiculous about the multi-skilled activities. It won't work."

I mentioned earlier the importance of top management visibility in sanctioning and participating in the change effort. The small size of Clyde Dock Engineering allows Burt Ellison to go one step further. All new employees are oriented by the general manager before they begin work. In Burt's absence, this function is performed by the production manager. The general manager also holds frequent meetings with the entire yard to discuss marketing opportunities and production problems. This sort of personal attention is obviously facilitated by the small size of the yard, but there is substantial room for improvement in yards no matter how large. A little personal touch goes a long way.

A counter argument to this sort of activity on the part of top management is that it is too time-consuming, that high level managers are busy people and have many other things to do. I think Burt's observation on this point is interesting. He said that under the old method of doing business, he, as production manager would spend 30% of his time dealing with personnel grievances. Under this new system, his production manager spends

only 3% of his/her time on grievances. So perhaps it is not a question of "if" but rather, "when" personnel matters are attended to (up-front consultation, or remedial grievance processing). It reminds me of the commercial, "You can pay me now, or pay me later."

My impression from visiting all three of the yards I have discussed today, is that they initially focused on their problems rather than jumping quickly to solutions. This is also the process described by Bud, Ken, and Barry from the Beaumont Yard. I think we tend to fixate on solutions, rather than problems because they (solutions) are easy to get your arms around and also because problems require difficult and sometimes painful self-analysis. On the subject of "jumping to solutions", a few comments on quality circles might be in order. Many American firms have latched on to this particular solution without giving much time to analysis of their problems. It was interesting to hear Prof. Okamoto comment today that quality circles in Japanese shipbuilding are just one small element of a much larger and comprehensive process of analysis and innovation.

Which brings me to the role of the shipyard's technical department in helping to bring about organizational change. Too often this change process is considered something for the hourly, not management nor the technical staff. In fact, the most significant innovations, require change at all hierarchical levels and in all departments. For engineering, the shift to a project orientation has proven to be no problem in these yards. They are enthusiastic about the change. They have the technology (CAD) and the manufacturing model (zone production) to support multi-skilled or multi-craft self-managing small work teams once they are directed to do their work to conform to these new production needs.

If all else fails there still are some important strategies which can be initiated to help save the jobs of shipyard employees. In Landskrona, Sweden after several years of debate, the Swedish government in 1980 decided to close down its yard in this town. But instead of just accepting the unemployment of 3200 employees as inevitable, the management and union of the yard in conjunction with governmental officials decided to establish a process to save these jobs by creating new companies on the physical site of the shipyard. There are now over 40 new companies and in the facilities of the Landskrona Shipyard. Over 70% of the shipyard employees are working for these companies. Most of the rest of the "old" employees work in other companies in the town. Although a majority of the products of the new companies have been primarily centered on shipbuilding and shiprepair related work, several firms have been setup in product and service areas quite removed from marine construction. There are several high-tech firms. There has been a successful company which manufactures hearing aides as well as several new service organizations that now operate in Landskrona Shipyard.

I'd like to close with a quote from a book written by Norbert Weiner in 1950. The author's subject matter was the use of computers.

"I'm afraid that a community of human beings is far more useful than a community of ants. If human beings are condemned and restricted to perform the same function over and over again, he or she will not even be a good ant, not to mention a good human being. Those who organize us according to perfect individual functions and perfect individual restrictions condemn the human race and move at much less than half speed. They throw away nearly all our human possibilities by limiting the road to which we adapt ourselves to push to future contingencies and reduce our chances for a recently large existence on this earth."

In closing, I would like to express my thanks to the German

Marshall Fund for the small travel grant which enabled me to visit European shipyards.

Questioner: Peter, it seems that the project leaders function as mini-ship superintendents at the Arendal shipyard, the size of the work package and the number of workers coordinated being much reduced.

Peter: That's right, except that the small work teams under a project orientation remain together as a unit for as long as possible. A traditional ship superintendent oversees a much larger work force it is a work force constantly changing. Arendal management is making a substantial effort to keep intact their project teams. That does not mean that the traditional craft departments are done away with. As figure 1 shows, they are still therein the yard. However, under the new system a craftsman turns to that department only for technical assistance. It is the project leader, and not the head of the craft department, who now manages the workers' time.

Questioned What is your perception of recent innovations in shipyards in Europe regarding their use of human resources?

Peter: They are far more advanced than us. Most of what I did see has to do with common sense management coupled with improved production processes to make better use of the skills of employees. I have to say that I consider this innovative because I see very little of it going on in the States. I think Burt Ellison of Clyde Dock Engineering typifies this approach. He treats his people with respect and listens to them. He sees hourly employees as blue collar experts. He takes every measure possible to hold on to them, to keep them employed. There is job security for the core group of 180 employees in the yard. I feel this is innovation, even though it makes good common sense.

Questioner: At the Arendal yard, are trade supervisors provided for each trade, or are broadly skilled supervisors responsible for all the crafts in a project team?

Peter: They are at the point now where all supervisors are broadly skilled. But I want to emphasize that they value supervisors more for their general organizing and coordinating skills than for technical expertise in the crafts.

Questioned How did Arendal deal with the natural fears of the employees in shifting from a craft-oriented system to a project-oriented arrangement?

Peter: "They did it very slowly. However, the president of the company told me he wished that they had done it more rapidly. I gathered that the engineering department played a catalytic role in that they produced work packages that would be difficult to accomplish in the old manner. They also did considerable preparation throughout management ranks. I'm afraid I didn't have enough time to get more information to answer this question.

Questioned I am interested in a statement you made about a company that was interested in new products other than marine construction. Did those alternative product suggestions come from employee involvement groups, and how did they do the marketing?

Peter: In the shipbuilding industry, I visited one facility that was engaged in the development of alternative products. At Landskrona, Sweden, the ideas for new products came from many sources, some from the workers, and some from management of the yard. The yard was closed as part of a national rationalization effort on the part of the Swedish government. The workers through their union and management developed ideas for new uses for the physical plants, and the government assisted with additional ideas and with some capital.

Employee Involvement at Bethlehem Steel: Awareness and Application

John Eck

Michael Gaffney John Eck spent 13 years as an ore miner before becoming a machine operator at Bethlehem's Lebanon Plant, fabricating railroad spikes and mine roof bolts. Since 1981, and until very recently, he has been plant coordinator for employee involvement at Lebanon. Currently, John is an employee involvement specialist at-large for the Bethlehem Steel Corporation. John is a member of the Steelworkers.

This afternoon I am going to discuss with you two important topics: awareness and application.

Awareness is "recognizing or being exposed to the need for change." Application is actually beginning to change behavior by doing something different.

I would like to ask you to participate in a little exercise that will help to demonstrate the difference between awareness and application. To begin, would you all please stand.

My first comment to you is, "Through extensive research, the Surgeon General has determined that smoking may be hazardous to your health." The findings were continually communicated to the public and printed on each pack of cigarettes. Therefore, it is safe to assume that everyone in the world is "aware" of this fact. In view of this information, anyone who is still smoking, please sit down.

My second comment to you is, "The Food and Drug Administration performed extensive tests on the effects of caffeine. By inserting mass quantities of caffeine into the diets of laboratory rats, the F.D.A. proved conclusively that caffeine has an effect on the central nervous system." In view of this information, anyone who is still drinking coffee, please sit down. However, anyone drinking decaffeinated coffee can continue to stand.

I have one more comment. "Through an extensive research program, the federal government determined that most auto accidents happen within five miles of home. Therefore, the federal government recommends that seat belts be used no matter how short the drive." Anyone who uses seat belts all the time when they drive, stay standing. Anyone who doesn't, please sit down.

To those of you who are still standing, you have decided to change your behavior by doing something different; thus awareness resulted in application. I applaud you and you may be seated. Thank you for participating in this exercise.

In each case, everyone was aware of the condition or situation described. However, as some of you began to sit down, it illustrated that you did not choose to respond to this awareness by changing or modifying your behavior. You evaluated the situation, made a decision, and continued to perform in the same way despite the information that appeared to warrant a change in behavior. This exercise begins to identify the initial steps of a change process: a) awareness of need, b) performance of new behavior, and c) preference for new behavior.

People do change, organizations (business/industry) change, technologies change. The reason that people, organizations and technologies change is, in my opinion, because of the impact of the external environment and the internal environment. Let's look at the shipbuilding industry to make my point. When I mention external environment, I mean the environment outside shipbuilding — such as the economy and/or market for products. When I say internal, that means "inside" the individual shipbuilding companies.

What is happening in industry is affected by those outside forces which, in turn, greatly change the forces internally — for example, the economy, which has for some created instability, which creates change. Fortunately, some industries are able to recognize and have an "awareness" of that and are willing to make the effort to adopt the necessary changes to remain viable enterprises.

Conversely, there are those managers who were presented with the same circumstances, evaluated the situation, and made the decision to continue to perform the same way despite the information that appeared to warrant a need for change.

If you are part of the group that recognizes the need for change, it is your responsibility as a manager to present to those within your organization (who have been doing business the same way for a long time) the concept of the awareness for change.

Unfortunately, some are looking at making changes only within technology and completely ignoring their most valuable resource, their people.

For a business to make changes, in my opinion, it must change all three (people, technology and the organization). I call that a "change process," and it is difficult — it takes time and effort, it requires patience and tolerance, you must be committed, it requires understanding, demands cooperation (especially if unions are involved), and you must have a willingness to work at it. If there is a *resistance* to change, is it a function of the individuals involved, or of the way the organization manages them?

First, there must be awareness of a need for change, then a pressure for change must be felt before change will take place. Let us assume that an organization has recognized the need for and wishes to initiate a change process. In instituting a change process, most organizations will find it absolutely necessary to make existing labor unions a valuable partner. Plant management needs to convince local unions that they are making a serious effort to change the labor-management environment in a positive direction.

One of the vehicles most widely used is the implementation of Labor-Management Participation Teams and/or Quality Circles. LMPT, quality circles, etc., involve commitment not only to productivity and quality, but to the self-development of employees. Union involvement will ensure that there is equal emphasis.

It is at this point that labor union resistance may be felt quite strongly.

Some unions claim that employee participation will divide the worker and his elected bargaining representative. Some unions also claim that the union will work with management through the already existing structure of in-plant union representatives, such as shop stewards and grievance committeemen. They ask: Why do we need some new organization when one already exists to handle these matters of mutual concern?

Another union concern is: What is the company going to do with its share of savings that could be incurred by teams? Are the workers who invest their time and energy on teams being adequately and properly rewarded for their participation?

Union leaders have good reason to question labor-management participation teams, quality circles, etc.

In many companies, management commitment to teams, quality circles, etc., is superficial at best. For the union leadership

to commit to participation without a corresponding management commitment constitutes a form of political suicide, for which most union leaders have little desire. That is to say, the political consequences of going out on a limb with the membership, only to have management saw off the limb later, are not to be taken lightly.

The primary purpose of an employee involvement process is to bring a common understanding to *all* employees of their *real* worth to each other and to the organization, and to make us realize how we can enhance the conditions that exist in our respective businesses. It will also help develop (collaboratively) a system which will allow employees to make decisions affecting their jobs and workplace.

The contract, the roles and the procedures will always be there. The process, if structured properly, will maintain the status quo.

I believe employee involvement efforts have been and are concentrating on structure and not on sharing philosophies between labor and management.

For employee involvement efforts to be successful, labor and management *must* have shared values. That takes work and a commitment to work at it, as I stated earlier when I talked about change. My experience has been that, where this kind of effort has taken place and is an on-going process between labor and management, the employee involvement process has more meaning, is valued more and is embraced by both constituencies.

There is a need to build on those shared values that will help create a successful effort. In turn, this will create an effective and efficient business.

In 1980 the Bethlehem Steel Corporation, reacting to the obvious need for action due to the fluctuating market for their product and the changing work force, instituted processes that were the basis of a very successful and on-going program of labor and management cooperation and collaboration.

One of the very first joint efforts between labor and manage-

ment was the formation of Labor-Management Participation Teams, known as LMPT's. These teams are made up of voluntary groups of employees from the same or related work areas who meet to solve work-related problems. Presently within the corporation there are six facilities with active LMPT's meeting regularly, and two other facilities in the formation stages.

Another example of joint efforts of labor and management would be the coordination of customer visits to the various plants to meet with employees to discuss mutual concerns regarding specific products.

With regard to the "white collar" effort within Bethlehem Steel, a participative process has been implemented, and is on-going, in sales offices across the corporation and within the home Offices.

In addition to involvement with labor and salaried employee programs, management has also formed quality teams using the Juran method to identify, analyze and develop solutions to quality-related problems.

I would like to quote Peter Drucker, behavioral scientist who said

One has to assume first that the individual human being at work knows better than anyone else what makes him/her more productive; even in routine work, the only true expert is the person who does the job.

All of these examples of on-going applications, as well as programs planned for the future, confirm Bethlehem Steel's awareness for change and the commitment to work with their employees to strengthen the cooperative effort to ensure a successful future.

Let me close with a quote from the philosopher Plato

Tell me and I will forget; show me and I will remember involve me and I will understand.

Alignment of Management Structures in Support of Labor-Management Cooperation Efforts

Randy Duke and Jess Christman

Michael Gaffney Randy Duke and Jess Christman are partners in the consulting firm CORE Group.

Prior to joining the partnership, Randy held a position as Senior Consultant with the American Productivity Center where he served as Project Manager for the consultative work undertaken for Cameron Iron Works and for white collar staff of Bethlehem Steel Corporation In addition to his current consulting assignments (American Airlines, Bethlehem Steel Cameron Iron Work, Eastern Airlines, Southwestern Bell and Western Airlines) Randy also serves on the faculty of the Human Resource Management Department of the University of Houston

Jess Christman was also with the American Center for Productivity as a Senior Consultant, and before that as Quality of Work Life Consultant on the Industrial Relations Staff of General Motors. Jess has been involved in development of joint union-management efforts in fifteen locations throughout the United States.

Randy Duke I would like to start by telling you a little bit about myself and the approach that I'll take. I became involved in employee involvement as a member of the armed forces; I was in the army. The army is dealing with a lot of the same kinds of issues that the shipbuilding, automobile, and airline industries are dealing with. It is basically the issue of how to change in a turbulent environment in a way that will allow you to perform your job more effectively. I spent a number of years working on that issue with them. I then went to Shell, then on to the American Productivity Center, and finally joined Jess Christman, who is also a partner in the CORE Group.

My focus normally is to be very practical. I'm very mindful of the expression KISS — "keep it simple, stupid." If we get down to the basic concepts we will do fine. But at the same time I would like to stretch our thinking as we move through the next half hour.

There's a helpful notion that says you see change when the following happens when dissatisfaction with the present is greater than the rewards of the present. But that in itself is not enough. The next thing that you need for change to occur is practical first steps. Some of you may say, "Hey, work redesign innovation is a great idea, how do I start, where do I go?" One of the things that we've discovered is that it's very important to work with a management group as you move forward and there are some important reasons for that.

The first one is that when you think about an organization, the first picture that pops into your head is a pyramid. This structure made a lot of sense for many years in terms of how we manage our businesses. It consequently created a class of people called managers. The pyramid is designed to operate very effectively in an environment that is relatively stable and has relatively limited competition. It is designed for information to flow up and down. A lot of times, however, the focus is more on the down direction. One of the main points that has been reached today is that this type of managing, which has been operational over the past hundred years, is gone. It's leaving the scene. Surprisingly enough, places that you wouldn't expect, like the army, which is moving to a regimental and a cohort system, are also realizing that. The way we think about managing our resources is radically changing. We are moving away from thinking about managers as a class of people to thinking of management as being a necessary organizational function. What we've discovered is that there are people in

cross-skilled teams down at the bottom of the pyramid that can manage themselves effectively. What's happening is that the middle of the pyramid is getting crushed. I'd like to focus on what some of the organizations we're working with are doing in terms of thinking of how to crush the pyramid and how to reorient "getting the job done" so as to be more effective in a competitive marketplace.

There are six C's we talk about that are very important as we start working with management groups. The first C, for creating a peak performing organization, is understanding your context. That is done by asking the questions: What are the possibilities available to us? What is our marketplace? What is our environment? Who are our customers? What is the big picture? Does it make sense to stop being a shipyard and become something else? It's the first thing that an organization needs to do. It is a reasonable first step for a management group that begins to think about participative management and labor-management cooperation.

The second C is clarity. Given a certain context, what are the options available to us and where do we want to go? There should be some goal setting in the first step as the management and labor group meets and starts to talk about the context.

Out of that comes something important which is *conviction*. When a certain course of action has been decided upon, all must agree that it is the right course.

The next thing that is needed is competence. It may be well and fine to say we want to start a labor-management effort we want to move to participative management, but we must find out how to develop the skills and tools necessary in order to make the move.

Each of us in our positions has been socialized to do things pretty much on our own. The skills that we learned involved being good individual problem-solvers. Thus, one of the tasks that has to occur with a management group involved in employee involvement is letting the members of the group in on the action in terms of how it is that jobs are changing and problem-solving tasks are changing. That requires tools and abilities.

The fifth C is cooperation. It entails working together as a team to reach the established goals. The right kinds of tools, either the technical type or the interpersonal type, enables us to reach those goals.

The last C is creativity. Problems can arise in this stage if you don't reward people for coming up with better ideas, or new ideas for improving performance. Some of you may be familiar with something called entrepreneurship in organizations, which involves rewarding people for being risk-takers and coming up with innovative new ideas. Creativity involves this entrepreneurship principal and the work is in bringing new ideas into the organization.

Those are the kinds of things that we deal with when we talk with management groups and begin to prepare them for joint labor-management cooperation and participative management. We believe there are some questions that need to be answered as you move forward with such an effort. They have to deal with top, middle, and lower management. We've been involved in efforts that have been termed successes, some which have been failures, and some which floundered. We've been through different life cycles with these efforts, be it in the steel, automobile, petro-

chemical, or airline industry. Once you get the effort off the ground, have some teams working together, and have had some initial team building and discussions about how to share values and philosophy, the rubber meets the road. People start asking the following questions.

Of top management they ask Do they really know and understand what's going on down here? Do they buy employee involvement? Are they committed? Do they show up at the meetings? Are they participating when they set up task force meetings? Are they supportive of that kind of effort?

Middle management has a real crisis on its hands with the pyramid because the pyramid was designed basically for middle managers to provide technical services or to pass on information. The roles of middle managers change as you move forward in an employee involvement effort. There's a move from the role of boss to the role of coordinator. There's a move from the role of manager to the role of facilitator.

The "new" organizations, such as People's Express in the airline industry, and the mini-mills in the steel industry, are figuring out how to become more flexible. In an environment that's turbulent and changing, you're going to want a highly flexible organization that's able to respond quickly and effectively to change. To do that, you need different kinds of communications. Not only do you need up and down exchange of important information, but you also need diagonal and horizontal communications. That's the role that begins to change for the mid-level manager. They become conduits of information that flow sideways and to other task groups as opposed to just the up and down chain of command.

The four questions important to middle management that you're going to have to answer are: 1) Is the top really serious, or is this something we're just going to do in bad times? If we exchange all the financial information today, will we go back to the old way of effectively sharing that information when things turn around? 2) Is this in the organization's best interest? 3) Is it in my best interest? and 4) Given the move to a new way of managing the business, how do I go about working differently with the people in the organization? How do I begin putting together different kinds of problem-solving groups?

The first line supervisor asks the same questions, but they're a little more acute, a little closer to home. The supervisors ask: What is my job? If you have work groups which are semi-autonomous work teams or autonomous work teams what will be going on back in the workplace? How is my job any different? One thing that they have to learn is how to work in teams, which involves a socialization process which we haven't spent much time discussing.

A lot of the organizations that have this tall kind of pyramid did a very effective job of telling people how to manage. What they didn't teach was how to lead. One of the things that we have been focusing on as we've worked with different industries is not only how you manage, but how you lead a group, how you lead a team, what skills are required.

That's a brief overview. Now I would like to talk about the approaches we've taken and the things we are learning. One of the first efforts that I was involved in, outside of the military and outside of Shell, was with an organization called Cameron Iron Works. They make oilfield equipment. They were doing a booming business at the time but they recognized that they had to become better managers. They felt that the union wasn't interested in joint effort, so the approach they decided on was management training. They selectively pulled people in from different areas and conducted the training. That's one approach.

The second approach is an approach that we've taken at Eastern Airlines with the support of the four unions. It involves

joint activity and changes in the management group there. That approach started with the CEO/COO saying, "This is good stuff, but do we need to do it?" They encouraged interested managers to go ahead and do team building and to learn the skills involved. Thus what we had were selective groups. It was more of a management volunteer process at the executive level, cascading down.

Western Airlines worked from a different set of criteria. The guy on top said, "We're all gonna do it. We're gonna start with me and my group and we'll work down. We're going to focus on one part of the organization and take it all the way down to get ready for the joint labor-management start-up in the spring. We'll do that, by training all of the managers in that particular department." But the training isn't what's important. You really create an opportunity where people get to think about their jobs differently, learn some new skills, and have those new skills continually reinforced back on the job. What we've learned is that you're most effective if you take a group of managers that traditionally work together, all out together for training as opposed to taking just one or two. That's an approach that we've taken there.

One of the key issues in working with management groups is the notion of flexibility. What we've discovered is that in every case, although we know that there's a generic set of skills associated with being a more effective manager and leader, there is the need for customization. It's very much like the Beaumont case study this morning where they did an organizational diagnosis, listed the key issues for that organization, and then decided that they were not only going to work with the management immediately, but were going to work on some other issues as well. Every activity in the participative management training arena must be customized to your organization and its culture. Action research seems to be the most effective way to start. By action research I mean going in and finding out what's going on, meeting with people, and then, if you have a clear picture, developing a strategy with the internal group that's going to manage the participation program.

Does all that make sense? What I've tried to do is reinforce some of the key points that were made earlier today. The world is changing. There's a revolution going on and as we used to say in the military, "Lead, follow, or get out of the way." The revolution is here in terms of how we manage ourselves. The management function is shifting. The question is, are you able to change fast enough not to be a dinosaur? You really can choose only two of the following three choices as you move forward with any effort: FAST, CHEAP, or GOOD. As you think through ways in which to manage your business differently, you will be confronted with the question of how to reinforce and train those people involved in it in such a way that's GOOD and FAST, but not CHEAP. By that I don't mean cheap in terms of money as much as I mean cheap in terms of time, energy and effort. You can have FAST and CHEAP, but it won't be GOOD because it won't be reinforced. So, as you think through how you may want to move forward in each of your individual areas with an employee involvement effort, think about the trade-offs that might be presented to you.

Jess Christman is going to talk about the scope of activities that build on this issue of management — from labor-management cooperation, autonomous or semi-autonomous work teams, LMPTs, efforts that are pretty focused and localized in some cases, to what must happen simultaneously with management to support an employee involvement effort.

Jess Christman I want to make one clarification before I begin. Earlier this morning I heard someone ask, "What does

de-skilling the work force mean?" I worked four and a half years for General Motors building Cadillacs for wealthy shipbuilding executives and a few union leaders. I put in 42 brake pedals an hour, 168 before lunch, 168 after lunch, year after year. I was an expert; I was skilled. But it was so narrow. That is what is called de-skilling the work force — narrowing the skill to such a point that people simply can't use the intelligence God gave them.

What I'd like to do now is talk to you briefly about types of efforts that fit under some of the general headings that we've been talking about. In the first place, there are programs. In the second place, there are efforts to influence organizational arrangements. The third set of activities involves structural change or organizational redesign efforts. The fourth deals with redistribution of power and influence. I would like to talk about each of them in turn. Quality circles are programs. Problem-solving teams, as you develop them in your plants and organizations, tend to be programs. Employee involvement teams, another word for the same thing, are programs. Labor-Management Participation Teams (LMPT's), as John was describing, if taken just by themselves, are programs. They are typically bottom-up efforts—beliefs that you can make water run uphill, that you can move from the bottom up. I don't think it works. I don't think you can get to the organizational change involving fundamentally new ways of living together if all you do is implement LMPT's or other programs. I think they may be important and valuable as parts and pieces of a change effort, but by themselves they'll never make it. I say that because I have spent a lot of time and energy helping to start LMPT's, problem-solving teams, employee participation groups and the like.

Second are efforts to influence organizational arrangements. At that point, I think it has become clear that we are talking about generic categories: employee involvement, quality of work life, participative management, and Labor-Management Participation (LMP). Lately I've been spending a fair amount of time with Bethlehem Steel talking to a number of people in a number of plants, and what's interesting is that increasingly they don't talk LMPT any more. They talk LMP, in whatever form that may take. That these items, employee involvement, quality of work life, participative management — whatever you wish to call it —are generic categories aimed at influencing organizational arrangements is an important dimension that we need to look at and be aware of. They are not simply programs that tend to come and go depending upon the commitment and the interest of the management organization.

Structural change and organizational redesign take it a step further. Here we are talking about things that get into the very nature and form of the organization and shape it. Once you move in those directions it's going to be hard to back off. Gainsharing is certainly one key piece. Questions arise as to what happens to the money that LMPT's save. One of the answers is that in an organization that's moving towards employee involvement the money gets shared in some form. It may be a Scanlon plan, a Rucker plan, Improshare, profit sharing, or a whole series of schemes. But somehow it's saying, "Yes, everybody deserves a share of what is saved by whatever kind of participative effort we get into." Once you get into gainsharing, it is not easy to change and back off from it. Interestingly, gainsharing consultants have lately found that business is improving. The reason is that companies are beginning to make money. They're beginning to find that there is money to share. Starting a gainsharing program where there is no money to share isn't a very super strategy.

Next, I would like to talk about self-directing work teams. We have heard about autonomous work teams. We have heard about leaderless work teams and self-managing work teams. In any case, we have heard about groups of persons who come together

to manage their own business. This reminds me of a foreman I knew at a foundry in Ohio run by General Motors, who said at the end of one of these types of speeches, "You mean to tell me that you want me to ask my people what to do? Hell, I *tell* them what to do and I've been doing it for 40 years." That's precisely the point. As long as people are viewed as folks who need to be told, we are in a different type of mode. When we begin to say, let's have self-directing work teams, let's let people manage their own work life, then we are structurally changing the business.

We have been talking about the supervisor feeling threatened. He or she ought to feel threatened. Supervisors' jobs aren't long for this world the way they're currently set up. We simply do not need as many supervisors as we have in most of our manufacturing and production organizations. They are doing work that people can do and manage themselves. As we get fewer levels of management we begin to cut down the management work force as well as the hourly work force, we begin to get more effectiveness in the organization. We are structurally changing and redesigning the management system as we go. For those supervisors who remain, there are fundamentally new roles. Instead of being instruction givers and order givers, supervisors become people, consultants to their workers, people who manage the boundaries. Their whole job begins to change and that's a critical structural change to manage. Finally, let me stress that both of these strategies are both bottom up and top down. We need to do the kinds of things that I've listed under these programs, but if we do them in concert with efforts to change the structure, efforts to redesign the system, i.e., working from the bottom and the top, then we have a chance for success.

Finally, I would like to discuss the whole issue of redistributing power and influence in the organization. At this point we're fairly far out on the fringe. We have seen employee stock option plans used to buy out the companies. Weirton Steel did that in Weirton, West Virginia, the Rath Packing Company did that in Waterloo, Iowa, and other companies have done it. There is some question as to why anyone would want to sell a company to the employees if the company was making money. The answer is they don't. Caution must be taken when employees are offered the opportunity to buy the companies within which they work. Union-worker representation on boards of directors is beginning to happen. Randy was talking about Eastern Airlines and Western Airlines. There are several other companies beginning to see employees showing up at the board of directors meetings and saying, "Hi, boss, I'm here, and I'm your boss." There is some fundamental redistribution of power and influence in that whole process.

The four categories I have described may or may not involve joint union-management efforts. Any one or all of them can involve the union in a joint fashion, or they may not, depending on the circumstances. I believe that if you have a union present but you don't involve it in these processes, you aren't going to get very far. Sooner or later that union is going to undermine you and pull the rug out from under you. What we believe as a consulting group is that if you've got unions, you have to fundamentally buy them in on the process right at the beginning and the process has to be a joint and equal effort all the way through. It's very hard for managers to give up that power and it's very hard for union people to take that power because for both union and management, changing roles is a difficult process.

Discussion

Unknown I guess many organizations view problem-solving teams as sort of a buffer before they get into the heavier types of employee involvement and organizational redesign. Some

companies feel comfortable going slow while others wish they would have gone faster. My question is, does the speed at which an organization pursues employee involvement and reorganization depend mainly on its financial condition?

Randy Duke It not only depends on the company's financial position, but also on what the company is trying to accomplish and where it is trying to go. The company must weigh the trade-offs involved. Companies try to do the best they can with what they have. What we have learned is that union and management groups must first commit to being committed. As they go through the process, they are able to accelerate and that is one of the functions of that buffer, getting some experience with the teams which allows them to move.

Bill Batt I am anxious to hear from John Eck. He has had a lot of experience with the LMPT's at Lebanon, and Lebanon is cited by the Steelworkers' Union and by the industry as one of the best cases in the industry. Could you give us an example of one or two of the accomplishments or the mistakes made at Lebanon?

John Eck We had 13 labor-management participation teams in the same or related work areas. We had two salary teams, one from sales and one from the materials management department. We had one multi-million-dollar team which was a cross-section of employees from throughout the organization that was specifically put together to look at customer service and how it could be enhanced. The effort lasted for three and a half years. There were some good things that happened but they are difficult to quantify. It is not the type of process that can be looked at quantitatively. If the view of the process were to be focused on quantitative measures, I don't believe that the effort can be seen as successful. To me, this kind of process should be looked at qualitatively because of the types of things that are dealt with. People are involved, and that's very important to keep in mind.

Many people have used different types of measures, mostly quantitative for this kind of process. In Lebanon, some of the teams have saved anywhere from \$250,000 a year to \$400,000 a year, but we should also look at the other side of the coin. We should look at absenteeism, attitudes and how these impact on productivity, however you define productivity.

To latch on to the process at Lebanon and to measure it quantitatively is very difficult. One example of this appeared in the corporate publication called the *Bethlehem Review*. It involved a team in our number one area. They had a situation that dealt with a heater and an operator. The team saw a need for more incentive on both jobs. Quality was suffering, customer service was lacking and attitudes were at rock bottom. The team that initially attacked this perceived problem of incentive rates found out that it wasn't the lack of incentives that was screwing the work up, it was the way the jobs were designed. The heater was being paid six points and the operator was being paid ten points. We were expecting the guy who was being paid six to look at the job the way the guy who was being paid ten was looking at it.

That just doesn't happen. The group looked at this problem and after meeting two hours per week for roughly 38 weeks they came up with a solution. Their solution was a level-handed operation. Instead of having a ten point/six point system, they recommended a ten point/ten point. With this system, the operator and the heater would spell each other. One would heat and the other would operate the machines. When it came time to make repairs on the machines, you can bet your bottom dollar they both worked on the machines due to the fact that they were both being paid ten points. With the old system, the guy that was paid ten points had to be there because it was a part of his job description; the six point guy didn't.

The real bottom line of the level-handed operation was savings, which were astronomical. The quality of the products increased somewhere around 45 to 46 percent. The down-time based on machine repairs was reduced by 28 to 32 percent. The attitudes changed because the jobs were on the same level, and this change resulted in an increase in productivity.

A sales group I was working with was heavily into the redesigning of their inside sales force. This was another thing that proved to be very effective and efficient, but it was too little too late.

Ed Connolley Bethlehem has remained the last major supplier of industrial fasteners since 1972. Although the company has been in a survival mode since that time, it only started doing something three years ago. Would you please comment on that?

John Eck In terms of effort, one of the things that impresses me not only at Bethlehem Steel Corporation but at other corporations as well is that there is so much that happens informally that goes unnoticed. Unless you are on top of it, you don't see it, you don't recognize it, and it goes right past you. This informal type of union-management collaboration has been happening at Bethlehem for a long, long time. It has been submerged for so long but now it is starting to rise and become more recognizable.

John Bunch Without asking a pointed question, why have your teams not met for a year and a half?

John Eck The first reason deals with concessions, both on the corporation level and on the plant level. Another factor was the external environment. We were terribly affected by the economy. We watched our market for products go down as the economy declined. This external factor had impacts on our internal environment. We had extreme fluctuations in work force size due to attrition. The teams were in the depressed areas of the plant, so as the work in these areas went down, so did the teams' work. There used to be ten to twelve members on a team, but with the decline in demand, the teams fell to three or four members. The concessions and the fluctuating work force were the basic reasons for the teams breaking up.

British Shipbuilders Govan Shipbuilders Inc.

Case Study #3

Donald Macphail

Michael Gaffney Donald Macphail is Planning Manager at Govan Shipbuilders, responsible for central planning, production planning and control. He is also a naval architect, and lectures in this subject at Paisley Technical College.

INTRODUCTION

This paper is presented from a Govan Shipbuilders viewpoint, but it is believed that it reflects events in most U.K. shipyards whether British Shipbuilders subsidiaries or not.

BRITISH SHIPBUILDERS

The nationalised corporation was established in July 1977. The current organisation comprises four main production divisions, namely:

- Merchant Shipbuilding and Composite Division
This includes engine building, offshore construction and shipyards building both merchant and naval ships
- Warshipbuilding Division
- General Engineering Sector
- Shiprepair Sector

GOVAN SHIPBUILDERS

Govan Shipbuilders is part of the Merchant Shipbuilding Division of British Shipbuilders.

The Shipyard is located on the south bank of the river Clyde about 3 miles from the centre of Glasgow. It has a history dating back to 1860 and for most of its existence was known as the Fairfield Shipbuilding and Engineering Company.

Govan Shipbuilders was established in 1972 and the facilities were substantially modernised between then and 1976.

The current labour force stands at 2200, although the normal budgeted level is 2600.

INDUSTRIAL RELATIONS NEGOTIATIONS

Industry negotiations are conducted at a national level by H.Q. Industrial Relations staff with representatives in attendance from subsidiaries including local shop stewards and Industrial Relations Directors. Major negotiations take place annually.

Govan Shipbuilders - Industrial Relations

Negotiations at subsidiaries are within the framework of the National Agreement and deal with local problems and the practical interpretation of national agreements at local levels.

At Govan, negotiations are handled on the employee side by four main inter-union negotiating groups, namely

- All hourly-paid employees
- Technical and clerical staff
- Supervision and junior management
- Senior management

If necessary, trade union delegates may be involved and final appeal handled at the National level.

Events Leading To Phase 5/Enabling Agreement

The world-wide recession in the shipping and shipbuilding industry has led to shipyard closures and overall contraction of the industry in the U.K. as elsewhere. This has enforced on those employed within the industry the recognition of the need for radical measures for survival. This need was recognised by management and labour alike. In the U.K. an action plan was prepared for the complete review of methods and procedures used in the industry and the adoption of the best available methods and technology.

For the action plan to succeed it was recognised that there was a need for an overhaul of existing labour practices and demarcations so that the most effective use could be made of new technology and methods. To this end, the views of senior management from each subsidiary were sought regarding the changes in labour practices which were most desirable. From the responses was distilled a list which formed the basis of negotiations from which the Enabling Agreement was derived.

THE NATIONAL AGREEMENT

The National Agreement applies to all employees of British Shipbuilders and its wholly-owned subsidiaries. The key feature of the Phase 5 National Agreement is the Enabling Agreement and is detailed below. This agreement provides for a weekly guaranteed payment equivalent to 75% of normal 39-hour earnings during periods of temporary lay-off caused by unavailability of work. The Agreement also provides for enhanced benefits for manual workers for absences from work due to sickness or injury at work. All employees are granted an increase payable on acceptance of the Enabling Agreement. This is a flat rate for all adult employees. The Agreement provides for the continuation of existing payment systems and conditions and allows for the operation of local agreements except where superseded by the Phase 5 Agreement.

THE ENABLING AGREEMENT

The Enabling Agreement to revise working practices was concluded between British Shipbuilders and the Shipbuilding Trade Union Negotiating Committee in the recognition that changes in methods and working practices were essential to enable the industry to significantly improve its performance and

productivity and hence competitiveness when tendering for new orders. It was also intended to provide an opportunity for enhanced earnings for all employees through implementation of the agreement.

The principal features of the Enabling Agreement are

1) Interchangeability

This allows a craftsman with one set of core skills to work alongside another with a different set of core skills on a temporary basis to smooth the demand for labour.

2) Flexibility

This allows a craftsman after suitable training to get on with his job without having to seek assistance from another trade, thereby avoiding hold-ups in his own job.

3) Integration

In trades with a substantial overlap in their core skills, e.g. shipwright/plater or coppersmith/plumber, after suitable training each will be able to operate the full range of the total of those core skills, becoming, in other words, an integrated steelworker or integrated pipeworker. Integration leads to continuous flexibility within the groups.

4) Composite Groups

Composite groups are groups of 2 or more trades. The number and ratio of the trades in the groups is taken in relation to the target man-hours for the tasks to be carried out, within which there will be interchangeability and flexibility. The members of the group will in the main use their own core skills until their task is held up or until another trade requires support to complete their task.

5) Ancillary Workers

Ancillary workers will be fully interchangeable within the ancillary groups as required.

6) Staff Employees

Staff employees are used where their knowledge and experience are most effective and can be interchangeable as required, again according to individual skills and experience.

7) Area Supervision

Area supervision is operated with full acceptance by both hourly-paid employees and staff, and in the case of multi-trade manning, e.g. composite groups, the supervisor or supervisors are normally selected on the basis of the trade composition of the group.

8) Balanced Labour Force

The Agreement provides for the balancing of shortages and surpluses of manpower with the requirements of the workload by using surplus trades to supplement trades with a shortfall in labour subject to available skills and experience, i.e. interchangeability. This is subject to consultation.

9) New Methods Equipment And Systems

For the introduction and operation of all new methods equipment and systems, the following approach applies:

a) Initial consultation, particularly in the areas of health, safety and training.

b) Joint agreement on the most efficient method of working. The newly agreed manning scales and methods are then operated.

c) In the event of disagreements these shall be taken through procedure. In the meantime, the new system will be operated.

10) Shift Working

The Agreement provides for shift working when necessary to improve efficiency, or to maintain or recover delivery dates. When the need arises at Govan, discussions take place to conclude sensible and efficient arrangements.

11) Adoption Of The Best Working Practices Throughout The Industry

Supplementary to the Enabling Agreement and as a result discussions between subsidiaries, a small number of existing practices were identified at other shipyards whose adoption offered scope for performance improvement. These were adopted at Govan coincidental with the enabling agreement. Similarly, certain existing Govan practices were available for adoption elsewhere.

12) Associated Training And General

To ensure the full implementation of the terms of the Agreement, it was recognised that training or retraining would be an essential element.

The importance of covering all aspects of safe working practice and health protection in the implementation of the Agreement is recognised as a prime concern.

13) Operation Of New Practices At All Times

The practices covered by the Enabling Agreement, including overtime and shift working, apply throughout the Company at all times. In the event of change being sought by either management or unions, the practices established under the Agreement continue to be operated while the matter is being pursued through procedure.

PREPARING FOR IMPLEMENTATION

COMMUNICATIONS BRIEFING TO ENTIRE LABOUR FORCE

Immediately following the signing of the Enabling Agreement the Company embarked on a project of communications to all employees.

Aim

To ensure that all managers, supervisors, shop stewards, hourly-paid workers were aware of and understood the Agreement, its importance to the Company in terms of productivity gains, and the need for the Company to support the Agreement by ensuring the right materials and information are provided at the right place and the right time.

Method

It was decided to use a cascade briefing technique employing a standard brief for all levels, accompanied by a video entitled "the Need for Change."

The project was divided into three main stages beginning in early March, 1984.

First Stage

Prepare and agree on the form and content of the standard brief and method of presentation.

Train senior managers in briefing techniques, using them to and refine the brief and at the same time creating the discipline to absorb the Agreement.

This stage was completed by the end of March 1984.
Note: The brief was a detailed explanation of the Agreement supported by practical examples and by overhead projector slides.

Second Stage

The senior managers were used to brief departmental managers and senior staff.

Briefing training was continued for departmental and supervisory levels to enable them to participate in Stage 3. By using this approach the senior managers and staff had to understand the Agreement before confronting their subordinates.

Stage 2 was completed by the end of April 1984.

Simultaneously a tape/slide presentation of "the Need for Change" was prepared.

Third Stage

"Need for Change" was approved by directors and a video was created.

Presentation of briefings to all remaining staff and to all hourly-paid workers was accompanied by a showing of "Need for Change."

This third stage was completed by early July 1984, by which time all employees had been briefed.

Format of Briefings

Each briefing session was of approximately 90 minutes' duration, comprising 20 minutes for the video followed by 10 minutes for questions, then 30 minutes for the brief plus 30 minutes for questions.

Groups were confined to approximately 40 in number and wherever possible to departments.

Briefings to hourly-paid workers were by departmental managers supported by an assistant manager or foreman. A member of the training department was present at each briefing for support and to ensure consistency of presentation.

TRAINING PROGRAMME

A) Assessment of Training Needs

Four distinct classes were identified as having different kinds of training needs, with further sub-divisions within each class. The four major classes were

- Tradesmen
- Ancillary Workers
- Supervision/Management
- staff

1. Tradesmen

These may be divided broadly into steelwork and outfitting trades

For steelwork there were three objectives

- a) Production welders should be trained to perform local fairing, arc-air gouging and grinding in addition to the full range of welding skills.
- b) Other capable steelworkers should be trained and be able to plate, fair, cut grind and carry out simple welding.
- c) A number of steelworkers should be trained in specialised functions such as N.C. Machine operation, plate forming and heat line bending.

Outfit workers perform more diverse roles but the following are examples of identified extension of skills training

Joiners

—Tack welding, drilling and tapping metal fixings and use of Hilti nail gun.

Pipeworkers

—Welding (to ship's structure except in way of watertight bulkheads), burning, sheet metal tray work.

Electricians

—Welding of fittings, sheet metal tray work, painting of equipment.

Fitter:

—Small bore pipe bending and brazing welding, burning and sheet metal work for hangers and trays.

2. Ancillary Workers

These comprise helper and labourer classes.

Training is being provided in crane and vehicle driving, temporary lighting, provision of ventilation and assist in launch way squads.

3. Supervision/Management

This area provides the greatest challenge as supervisors are required to control composite and/or integrated group containing personnel with trade skills different from their own basic training. Courses for supervisors are therefore designed to give them an understanding of the basic core skills of the trades they are most likely to supervise in their work environment. However, the main purpose of supervisory training is to make them aware of the need to improve and change the nature of the industry and to have a better understanding of the changes in training and the technique involved. Emphasis is placed on the particular role of the supervisor in the requirements of his job and his relationship with others including human relations and communications. He is introduced to the technological systems and method changes being implemented.

Finally, he is given an insight into the role of other departments such as

- Drawing Offices
- Planning and Production Control
- Design and Estimation
- Quality Assurance

4. staff

To date, most staff training has been of a specialist nature dealing with technological change, e.g. the introduction of CAD/CAM and on-line computer technology.

Introduction of new systems and procedures are also the subject of specific training.

5. General

The aspects of health and safety at work and the introduction to change are prime aspects of training for all classes of employees.

B) Implementing the Training Programs

Training programs devised covered both off-the-job course at the training school and on-the-job training. Training of tradesmen on new core skills was relatively easy using the

facilities available and taking advantage of a gap in the production program. Training of steelwork tradesmen is virtually complete, having been accomplished during the period of lay-offs between March and August of 1984. Similar advantage has been taken of the slightly later period of lay-offs for outfitting and ancillary workers. Training on the job follows immediately after training school courses and is well underway, with anticipated completion by the end of the year.

IT SHOULD BE NOTED THAT TRAINING OF INDIVIDUALS WAS SYNCHRONISED WITH THE COMPANY'S NEEDS AT THE TIME, AND PLANS FOR THE FUTURE COMPOSITION OF GROUPS.

Training programmed have been finalised for supervisory staff and commence in early December. Release of staff is more difficult, especially with an increasing work load, and most courses include an element of week-end working.

A training audit is carried out 6 months after on-the-job training commences.

C) Recording and Applying the Results of Training

A record is maintained for each individual of all courses attended and of on-the-job training, with a record of pass or failure. It has been proposed that each foreman be provided with statistics for each member of his group showing their basic and extended skills so that these can be employed to maximum advantage.

ORGANISATIONAL CHANGE-LABOUR GROUPS

NEW TECHNOLOGY

The philosophy of product work breakdown structure has been adopted by Govan Shipbuilders and many other U.K. shipbuilders. This has further emphasised the concepts of moduling and advanced outfitting which were introduced at Govan over 10 years ago.

Sufficient information has already been published on product work breakdown structure. However, the introduction of group technology and process flow lines for part families involving clearly identifiable work stations has highlighted the need for groups of different skills operating at the same location under one supervisor.

This concept is extended to on-board working by clear identification of ship zones where work is of a similar nature, e.g. accommodation.

NOT ALL EMPLOYEES ARE GROUPED

It must be recognised that the different shipbuilding trades have not all developed by accident and that there is still a need for specialised skills. The aim of the Enabling Agreement was to break down some of the rigid demarcation barriers which were both outdated and unsuited to the efficient operation of up-to-date technology.

It therefore follows that those employees who perform a distinct or specialist function will not be incorporated in composite groups.

Examples are

Manufacturing areas such as

—Pipe shop

—Machine shop

—Joiners shop

—Sheet iron shop

—Painting, etc.

On Board

—Specialist installation

—Commissioning and testing

COMPOSITE GROUPS

As previously defined, composite groups are formed from two or more trades.

Examples of composite squad working areas are

—Cabin module manufacture (established prior to Enabling Agreement)

—Outfit/machinery module construction

—Advanced outfitting

—On-board zone outfitting

This list is not exhaustive. It will be noted that composite squads are predominantly but not exclusively related to outfitting.

The composition of a composite squad is determined by evaluating the work content by trade to complete the overall task. Where the work content for any particular trade is minimal, that is, amounting to a fraction of a man-week, then that trade will not be included in the group. In this event the work will be covered by a suitably qualified person.

For example, if this involves a member of the Boilermakers' Society in the steelwork department, a member of the Boilermakers' Society in another department (sheet iron worker) will cover for that work content. However, if an outfit tradesman requires burning or welding assistance and the sheet iron worker at that particular time is fully occupied, the outfit tradesman can progress on his own job by providing the service himself. Hence the term flexibility. This is best illustrated by reference to the following example of an outfit composite group.

The potential savings is only based on the use of minimal manning input, but there are further gains available from the reduction of waiting time and from flexibility within the group.

Where composite groups are employed in a manufacturing flow line situation, it is important to balance the group to the average requirements of the work flowing through the work station and to maintain a steady group composition.

INTEGRATED GROUPS

There are two areas where integration will operate

—Steelwork

—Pipework

It will be understood that in the U.K. generally, and at Govan in particular, the term steelworker includes:

—Platers

—Shipwrights

—Welders

—Caulkers

—Burners

—Drillers

and is expanded under the general term boilermaker to include

—Sheet iron workers

—Boilermakers (engineering steelworkers)

It is our aim to establish two fully integrated steelwork group types comprising

Fabricators:

Responsible for fabrication assembly and ship construction.

This group includes platers, shipwrights, caulker/burners, drillers, helpers and welders — for functions where for safety reasons plater/shipwrights are not permitted to weld.

Welders:

For all main structural welding. The group will include some caulker/burners.

After full skill training and on-the-job experience, there will be complete interchangeability within these groups, leading to full integration.

Govan has enjoyed complete integration of plumbers and coppersmiths since 1963; they are now indistinguishable and classified as pipeworkers. This simplified management's problems in the allocation of labour for both installation and manufacture and the avoidance of duplicating facilities, all contributing to increased productivity and reduced costs which are now amongst the lowest in U.K. shipbuilding.

AREA SUPERVISION

Currently Govan is establishing area supervision related to control of work at work stations in shop or "on-ground" locations and on board ship for work in identified zones.

As indicated above, the choice is largely governed by the mix of skills in the groups supervised subject to the availability of suitably qualified supervisors.

In shops it is considered that a foreman should be responsible for a maximum of two station groups, while on board ship this will be restricted to one group wherever possible. Ideally each group should not exceed 15 men.

Consideration has been given to the adoption of primary zone management organisation. The primary zones identified as the basis of this organisation are

—Hull and deck

—Accommodation

—Machinery spaces

—Overall electrical installation

Adoption of this policy would involve the reorganisation of design and production so that all work associated with each zone is the responsibility of one design manager and one production manager, thus leading to reduced interface problems and simplified communications.

This policy would also conform to the basic principles of group technology.

IMPACT ON TECHNICAL/SERVICE FUNCTIONS

COMBINED IMPACT OF NEW TECHNOLOGY PLUS NEW WORK ORGANISATION

The impact on pre-production and service departments of introducing new technology, new methods, new systems and new work organisation simultaneously should not be underestimated. We are attempting to compress into a short time-span what some

of our competitors have been steadily developing over a number of years. This problem is exacerbated by the need to keep cost and overhead down in times of lean order books because additional costs are undoubtedly incurred during the development and initial implementation period. In many cases small shipyard just do not have the necessary resources or expertise to develop and implement the changes required.

However, from personal experience it has been observed that small shipyards generally have less inertial resistance to change and that is to their advantage because a small team can create much greater impact through shorter lines of communication.

Areas other than direct production which are affected by these changes are as follows

PRODUCTION ENGINEERING

The method of build must be established at an early stage so that the detailed production drawings are developed to suit production requirements.

Thus product engineering has two main objectives

—To identify major manufacturing or production problem and to find a solution.

—To break down the ship into products which permit the most effective use of facilities and labour organisation.

Inherent in this process is the aim of maximizing advance outfitting (pre-outfitting) and moduling which has been practised to some degree at Govan for over 10 years but which is being substantially extended.

It is our aim, for pre-outfitting and for pre-planned pipe manufacture, to apply zone outfitting and in the process separate the activities of steel and outfit whenever possible. The eventual aim is to achieve a pre-outfit level in the region of 80%-90% by weight and a pre-planned pipe level of 90%. We have evidence that this is being achieved in Japanese yards.

The general approach to product engineering for pre-outfitting is as follows

- 1) Apply all work downhand where possible.
- 2) The larger the unit, the less the interface.
- 3) Maximize outfit on both sides of flats.
- 4) Reduced number of made to place pipework.
- 5) Reduced staging.
- 6) All lifts are direct.
- 7) Working tools are readily available.
- 8) Work is taken to worker.
- 9) Job is easier to organize and plan.
- 10) Better quality.
- 11) Easier to supervise and control labor.
- 12) Erection on berth is speeded up.

Essential to all of the above, is the accuracy of steelwork and pipework.

TECHNICAL - DRAWING OFFICES

The drawing office must work within the parameters set by Production Engineering and produce drawings suitable for the product work breakdown structure.

This calls for work station or zone composite drawing containing all the information required at a particular workstation.

or zone — but *only* the information required to complete the task at the work station.

The introduction of CAD/CAM facilitates the production of work station composites by using an overlay method of drawing creation.

Advanced outfitting and moduling requires the issue of information and procurement of outfitting materials at a significantly earlier stage in the building process, and this imposes considerable pressure on design and drawing offices by reducing lead durations in times of short order books. To alleviate this problem there must be increased use of standards whose adoption provides further benefits in other areas of the Company.

- 1) Encourage design simplification.
- 2) Eliminate repetitive chores.
- 3) More time to address production problems.
- 4) Cost benefits.
- 5) They must be continually developed and maintained.
- 6) Reduce freedom to follow individual whims.
- 7) Familiarity is gained in manufacture and assembly.
- 8) Leads to better scheduling and leveling of the work load.
- 9) Batch manufacture saving in man hours.
- 10) **“Buying in” or “in home”** manufacture practical option.

It cannot be sufficiently emphasised that the success or failure of new working methods is very dependent on the influence of the design departments.

Govan has adopted the motto
“CHANGE BY DESIGN

PRODUCTION PLANNING AND CONTROL

The new technology and working arrangements require significant changes in production planning and control. Among them is the formulation of a build strategy document in conjunction with Production Engineering and Production Departments. This document specifies how the ship will be constructed and contains the overall program for its achievement. A preliminary version is developed pre-contract and expanded early post-contract as fuller technical details become available.

At the work-face level weekly schedules must be produced for each work station. Each schedule must contain manning levels for establishing labor group composition based on work content estimation and duration. In the case of shop manufacturing work stations, the content of the work schedule must match the composition of established groups.

The definition of the product structure and adoption of “part families” (group technology) helps to simplify the task.

MATERIALS ORGANISATION

It is of paramount importance that the right materials are delivered to the right point at the right time to provide the labour groups with the necessary materials (and information from drawing offices and production control) to permit effective working.

Parts lists are prepared in the drawing office and are in the process of computerization. This will permit monitoring right down the line.

Features of material organisation areas follows

- 1) Palletize.
- 2) Eliminate work preparation.

- 3) Pallet required date dictates the manufacturing sequence.
- 4) Pallet allocated with estimated work content.
- 5) Total work content in a unit is the summation of number of pallets.
- 6) Accurate monitor for assessing physical progress.
- 7) Accurate means of forecasting.

ACCURACY CONTROL= QUALITY CONTROL

The new procedures will be supported by more stringent accuracy control and quality control.

Standards have been set and control documentation designed for use by operators in self-checking at each stage of the steehwork manufacturing process. This will be extended to all relevant areas of the Company’s operation. For example, reference grid lines are used on outfit module construction and detailed on drawings.

The objective is to reduce the amount of “green” (“proud”) material to be cut off at later stages of construction and hence eliminate additional work content.

LABOUR COST CONTROL

Labour cost control must be reviewed to match the requirements of the new work organisation. Traditionally, this is by trade, department and contract, but must be adjusted to provide control information at the work station and labour group levels.

ESTIMATING

Traditionally, estimating is based on historical cost returns with a minor amount of analytical input.

The new work arrangements will result in labour costing by work stations and labour groups and eventually produce a base for better estimating.

The main problem lies in the transition period, and provision must be made to provide suitable returns to the estimating department during this period.

CONSULTATION & COMMUNICATIONS

CONSULTATION PRIOR TO IMPLEMENTATION

The Agreement specifies that there should be consultation before the implementation of new methods, new equipment, new systems or new procedures.

Consultation is interpreted as a communication, not a negotiation.

It is mutually accepted that change is essential but where there is disagreement the new method or procedure will prevail and be operated.

GOVAN HISTORY OF JOINT MONITORING

It has been Govan practice for over 10 years to monitor contract progress and discuss related production, technical or personnel problems and their solution. This practice was associated initially with the introduction of the Company Incentive Scheme.

Again, it should be noted that these monitoring meetings are not a negotiating forum any problems requiring negotiation are dealt with through normal industrial relations procedures.

Monitoring meetings consisting of management, supervisors and shop stewards take place weekly or fortnightly at departmental level, while the Company Overall Monitoring Committee meets at 4 to 6-week intervals.

COMMUNICATIONS STRUCTURE

To reinforce the Agreement and improve Company communications in an era of change, a formal communications structure has been devised. This takes the form of Cascade Team Briefings throughout the Company at regular intervals.

The initial training program has just been completed preparatory to the introduction of the briefing system. The principal features of the communication system areas follows:

a) Cascade Briefing

The Company content of each brief is passed down the management structure, with each briefer required to agree to the content and format of his brief with his superior. This comes down from managing director to foreman level.

b) Briefing Groups

Briefing groups will comprise not more than 20 persons and will be briefed by their immediate superior.

Where a supervisor is responsible for more than 20 persons, the briefing will be carried out in two sessions.

c) Regular Intervals

The briefings will be carried out at regular predetermined intervals not exceeding 6 weeks.

d) Pertinent Content

The content of each brief will be at a level suitable to the level of the briefing. However, major Company content will be of a standard content and format for all levels.

It is anticipated that about 30% of each brief will be Company content and 70% local content.

The theme of each brief will fall into four distinct areas:

—PROGRESS: against targets, performance, quality.

—POLICY explaining or re-emphasising procedures, policies or decisions affecting the team.

—PEOPLE: new appointments, personnel problems, etc.

—POINTS FOR ACTION priorities for the next few weeks.

AIM OF THE TEAM BRIEFINGS

- a) To keep the work force informed as to all that affects them within the Company.
- b) To set the scene for change.
- c) To encourage two-way communication.
Although the briefing is neither of a consultative nor negotiative character it is anticipated that feedback will be provided.
- d) To strengthen the role of the supervisor, which has tended to be undermined by the proliferation of specialist functions and industrial relations legislation.
- e) To kill the “grapevine” and stifle rumors before they undermine morale.

ANTICIPATED BENEFITS

It is expected that the following benefits will be realized through the implementation of the Enabling Agreement

- 1) Improved performance and competitiveness resulting in new contracts.
- 2) Increased job satisfaction.
- 3) Increased earnings for all employees.
- 4) Increased job security.
- 5) Provisions for job stability in times of recession.
 - transfer between departments (interchangeability)
 - transfer between subsidiaries (mobility)
 - lay-off arrangements
 - redundancy scheme (voluntary)

Puget Sound Naval Shipyard Bremerton, Washington

Case Study #4

Wayne F. Williams

Michael Gaffney Our next speaker is Wayne Williams from Puget Sound Naval Shipyard where he work as project manager. Wayne has devoted the past 34 years to working in shipyard production or staff functions to production. He began his career in the US. Navy and then continued at Puget Sound as an apprentice shipfitter. At Puget Sound he has worked as a planner, estimator, scheduler and progressman In addition, he has spent two years working as a production control superintendent in the Philippines.

Background

Our shipyard is located in the city of Bremerton, Washington, on the Kitsap Peninsula. It is surrounded by the waters of Puget Sound, which is about 35 miles — one hour — away from southwest Seattle by ferry.

Since 1891, when Congress appropriated the money, “not to exceed \$10,000,” Puget Sound Naval Shipyard has existed to provide service to the fleet. By the end of World War II, employment had reached a peak 32,000 compared to its present 12,000.

With the exception of the two world wars, Puget Sound Naval Shipyard had always been isolated from the large industrial work force areas. Many of the employees were second and third generation workers, grandfather, father, and son. In this atmosphere, there developed a great pride of workmanship, and quality was the expected norm.

In the early 1970s two other naval shipyards were closed. This action caused a realignment of the work force in all naval shipyards, bringing many established shipyard workers from both the east and west coasts to Puget Sound.

Today, our work force comes from the large commuting area of Greater Seattle and Tacoma, as well as the Kitsap Peninsula, with a varied background representing a fine mix of experienced personnel.

Union Representation

The Bremerton Metal Trades Council represents most of the employees of Puget Sound Naval Shipyard. The council is composed of the following affiliated local unions representing 8,500 employees:

American Federation of Government Employees (AFGE), Local #4&

International Association of Machinists and Aerospace Workers (IAM & AW), Local #2S2,

United Association of Heat and Frost Insulators and Asbestos Workers (Heat & Frost), Local #62,

International Brotherhood of Boilermakers, Blacksmiths, Forgers, Welders, and Helpers of America (Boilermakers), Local #290,

International Union of Operating Engineers (IUOE), Local #286,

International Molders and Foundry Workers Union (Molders), Local #158,

Sheet Metal Workers International Association (Sheetmetal), Local #247,

United Brotherhood of Carpenters and Joiners of America (Carpenters), Local #1597, #23 17,

United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada (UAP), Local #631,

Brotherhood of Painters, Decorators, and Paperhangers of America, Local #1 208,

International Brotherhood of Electrical Workers, Local#51P, and

Ship Scalers, Dry Dock and Miscellaneous Boatyard Workers, Local #1014 of the International Hod Carriers, Building and Common Labors Union of America.

The following organizations also have their own negotiated agreement with the shipyard

International Federation of Professional and Technical Engineers (IFPTE), Local #12, representing 1,200 employees,

Planners, Estimators, Progressmen and Schedulers Association (PEPS), Local #6, representing 300 employees, and

Patternmakers League of North America, Seattle Association Bremerton Branch, representing 14 employees.

Now that you know something about where we are located, where we came from and who we are, we will discuss our involvement with human resource innovation at Puget Sound Naval Shipyard.

Quality Circles At Puget Sound Naval Shipyard

Puget Sound became interested in the quality circle concept in late 1980. Our headquarters in Washington D. C., Naval Sea Systems Command (NAVSEA), felt the need for quality improvement, and, based upon the success of pilot programs in other naval shipyards, suggested that all naval shipyards participate in the quality circle process.

The shipyard's Productivity Improvement Steering Committee (PISC), a group of senior managers, was commissioned to review the recommendation by NAVSEA and decide if Puget should become involved with quality circles. After several meetings to discuss the advantages of the program, the PISC approved the implementation of the concept and recommended that a program manager be appointed to get the project started.

Program Management

The original program administrator appointed to establish the quality circle program was selected from the existing work force of the Project Management Section, Industrial Engineering Division, in the Production Department. However, this later proved to be a mistake. The person selected should have been at a higher level, reporting directly to the Commanding Officer. This would have given the program higher visibility and more immediate acceptability using the top down support concept.

Union Participation

One of the first assignments of the program administrator was to brief the unions on the quality circle concept and the shipyard's plans for implementation. This was a successful presentation which established the proper foundation for union support which has continued throughout the program. Representatives of the two major unions (Metal Trades and IFPTE), became permanent members of the Quality Circle Steering Committee.

Program Implementation

In January of 1981, a memorandum was issued informing shipyard managers of the planned implementation of the quality circle program, and requesting managers and supervisors to solicit volunteers for facilitators, circle leaders, and steering committee members. It was later proven that a memo was not the best way to obtain the right volunteers to start a new program. It would have been better to request managers in key positions to volunteer, and thus to obtain the top level of participation necessary to implement human resource innovations. In this manner, it is possible to obtain those key managers who wish to become involved, and not just those who are assigned.

Quality Circle Steering Committee

In March of 1981, the shipyard formed a Quality Circle Steering Committee (QCSC) composed of 10 people from the list of volunteers with the program administrator as the acting chairman. The committee selected two facilitators and twelve leaders to receive quality circle training. The Quality Circle Institute of Red Bluff, California, was chosen as the program development consultant. This choice was based upon price and availability. The consultant came on station to present the training. At that time, both leaders and facilitators received identical training however, in retrospect it was found that the facilitators should have received more extensive training, given prior to the training of the leaders. Immediately after starting the program, one of the original facilitators was reassigned and replaced by an untrained individual. This caused problems and made us realize that a backup should have been trained prior to the commencement of the program.

Forming The Circles

In April of 1981, the facilitators and leaders started the quality circle process with the creation of eight pilot circles. The pilot circles were to run for one year before expanding the program further. The eight original pilot circles completed their training in July. This training consisted of eight one-hour sessions for new circle members. Two additional circles were further selected to

expand the program, and their training commenced in August of 1981. We have since learned that new members should be provided one eight-hour training session instead of eight one-hour sessions. This action generated a better comprehension of quality circle techniques.

Program Charter

- 1) The shipyard issued an official memo establishing the quality circle organization in September, 1981.
- 2) The quality circle program was also institutionalized in the same month by the issuance of a shipyard instruction establishing policy, organization, and responsibilities for the Quality Circle Program at Puget Sound Naval Shipyard.
- 3) However, it would have been more helpful if the charter of the quality circle organization had been issued with a clear statement of goals and objectives prior to the start of the program. Similarly, the structure of the program should have been outlined prior to the establishment of the program.

Program Expansion

The original plan was to have only eight pilot circles on a one-year trial. The original expansion plan forecasted a total of 120 circles by 1989, but this plan was later revised to expand at a slower rate and to achieve 120 circles by 1993. The number of 120 was chosen because it represented 10% of our total employment assuming an average of ten employees per circle. We later found that expansion of the program was influenced by the availability of trained facilitators and part-time facilitators. Twelve additional quality circle leaders were trained in anticipation of program expansion. By October 1981, training was completed and two additional circles were formed for a total of ten active circles. The demand for circles was so great that expansion was being forced before proper evaluation of the original pilot circles. By December 1981, six additional circles completed the training. We now have a total of sixteen circles and a second facilitator was hired to replace a retiring employee. Expansion was happening very fast. Although originally we had planned for eight one-year pilot circles, we now have twice that number.

Employees' Attitudes

The quality circle committee conducted an employee attitude survey for future reference in development of the program. They found that the employees readily accepted quality circles as a means of involvement, but management was skeptical. At this point, we have not conducted a follow-up survey to determine workers' attitudes as a result of the quality circle program. However, we consider this an important item which must be accomplished to evaluate properly the impact of the program.

Facilitators As Members Of Steering Committee

Facilitators were originally members of the Steering Committee. However, facilitators were later removed from the Committee because it was felt that they might unduly influence decisions. More recently it has been realized that input from the facilitators is necessary for the Committee to properly function and they were reinstated as members in June of 1982.

I.A.Q.C. And Local Leaders' Association

As the quality circle program developed, it became involved with the International Association of Quality Circles, Greater Seattle Chapter. Circle leaders and members were invited to give presentations at chapter meetings. This action proved to be valuable in the development of a local circle leaders' association within the shipyard. The leaders meet each week during their lunch hour with one monthly meeting open to everyone, and managers are especially invited to attend. The meetings are for the purpose of discussing circle problems, solutions, and quality circle expansion and techniques.

Part-Time Facilitators

By August of 1982, more than 20 circles were in operation and expansion of the program continued at a brisk pace until reaching approximately 36 circles. We found that each facilitator could train and manage twelve circles and still maintain a quality program. At this time, the original expansion plan was revised to reflect the use of part-time facilitators. Part-time facilitators would spend no more than 20% of their time on circle activities. They facilitate only established circles, and work with circles within their own groups. This action allowed further expansion by turning existing circles over to part-time facilitators, and freeing the full-time facilitators so that they would be able to work with three circles each, assisting with circle meetings and management presentations, arranging training and outside contacts, reporting circle progress to management, and keeping meetings on track with quality circle techniques.

Program Visibility

In February of 1984, a Special Projects Office was established to combine productivity improvement, cost reduction and quality circles under one project manager. This action elevated the visibility of the programs by having the project manager report directly to the shipyard Commander. With the addition of six part-time facilitators, the program had expanded to over 50 circles by July of 1984.

Incentive Awards

Many of the improvements suggested by the quality circles deserved special recognition. It was decided that the circles would be allowed to submit their ideas to the incentive awards program, and the circle as a whole would receive recognition and each member an equal share of the monetary award when appropriate. Circles may also receive management initiated awards.

Management Support/Training

It is a perception of most circle members that there is a lack of manager/supervisor support for the program. This seems to be a major problem. Some of the problems relate to a lack of management understanding of quality circle techniques, lack of budget for meetings and training, and lack of implementation and follow-up on management presentations.

To combat the perceived lack of management/supervision support, an eight-hour workshop was offered to managers/supervisors. This should have been accomplished at the very beginning of the program. All managers should have an understanding of the concept so that support is developed prior to implementation.

As a result of the eight-hour supervisor workshop, several management circles were started. We also have a ship superintendents' circle, being composed of naval officers which we believe is the first of its kind in the United States Navy.

The quality circle office is now presenting a fifty hour, evening training program in conjunction with our local community college. Five credits are being given for the class and it has experienced capacity attendance, of both shipyard employees and the local community.

Continued Training

Training is the key to the future success of the Quality Circle Program at Puget Sound Naval Shipyard. The time is right and most employees are interested. Middle management seems to need reassurance that the technique is valid. Over the next two years we plan to train all of our managers and supervisors in our eight-hour workshop. We are using our shipyard newspaper and quality circle newsletter to provide a positive picture of quality circle activities. With quality circle techniques we are developing positive attitudes which promote job involvement and provide an awareness of the problem prevention process. We stress, however, that we are not in the quality circle business. We are in the improvement business.

Summary

The employment level of Puget Sound Naval Shipyard has remained stable. Therefore, our present quality circle program does not deal with hard economic issues, but is more a program for employee participation and job enrichment.

Employees have been allowed to form into circles on a completely voluntary basis and to select their own problems using quality circle techniques. Most circles consist of employees, without management or union involvement. The circles have not been directed or steered into solving management-identified problems.

Although it is difficult to identify total return on investment savings, the circles have documented many quality of work life intangibles. In the long run, it may prove to be a more valuable contribution than the estimated 2.2/ 1 cost-benefit saving has indicated.

We consider our present quality circle program the first step in human resource involvement, and we pass along the following lessons learned:

- 1) Before starting a quality circle program, an organization should establish the goals and objectives they wish the program to achieve.
- 2) The charter and implementation instructions which establish policy, assign responsibility and provide guidelines for program development, should be issued prior to program implementation.
- 3) Training should start with top management, facilitator, mid-managers and first-line supervisors, prior to starting any involvement at the employee level.
- 4) The Steering Committee should be fully trained in quality circle techniques and represent a broad area of the organization. It should be composed of both union and management, and top executives such as union president department head, division head, etc.

We recommend that you establish a realistic expansion plan. You can't train everyone at once, and you can't support too rapid

an expansion without loss of enthusiasm and the quality of the programsuffering. Rate of growth should be based on proper training of supervisors, managers, facilitators, pati-time facilitators, circle leaders, and circle members. Persistence in expanding is more important than speed of expansion.

The frustration threshold of the facilitators and part-time facilitators should be very high. They field problems of both the circle member and management. Turnover of circle members requires constant attention, and retraining must be accomplished. Motivation and enthusiasm must be maintained. It is a constant struggle to maintain program growth. In order to combat frustration and maintain a state-of-the-art program, the facilitators themselves should receive information concerning training and retraining.

Advanced schooling and network involvement is especially helpful in this area. Facilitators must possess the staying power to sustain the program over a long period of time until the proces takes hold at the grassroots level. Some experts believe this will take ten years. Others say the United States is not ready and quality circles will fail.

Management involvement consists of support and guidance. Managers and supervisors must take an active leadership role. Circles are constantly searching for a variety of problems from which they may select. The participation of both employees and management in finding solutions to common problems ensure that circles are working toward the goals of the organization.

Workshops

What Does All Of This Mean To Unions?

Although this conference has represented the interests of both labor and management there have been few presentations on employee-involvement and work redesign by union members themselves. To facilitate union discussion of these issues, a workshop was held specifically for union members on the second day of the conference. Management personnel were asked not to attend, in order to focus the workshop's discussion on union concerns about labor-management cooperation and to leave the discussants free to fully voice their opinions. The workshop was a brainstorming session centered around three issues

- the success of labor-management programs and their benefit to workers,
- management's commitment to employee involvement, and
- the possible weakening effects of participative activities and job redesign on union strength in the yard and at the bargaining table.

Success stories from yards such as Sparrows Point and NASSCO were previously unfamiliar to many union members present at the workshop, and an aggressive dialogue developed between those who had experienced labor-management cooperation activities and others who were just beginning to explore their practicality. Specifically, union members wanted to know whether these activities could actually help to save jobs or make a yard more competitive and how they could tell if companies were using participation to strengthen the business or weaken the union. Other members asked the group just how far they thought the union had to bend in order to make these processes worthwhile.

Workshop attendees further discussed the potential of the employee involvement process to supplant traditional union jurisdictions, such as the grievance procedure, workrules, and job classifications. When management appeared willing to spend money on employee problem-solving efforts rather than the grievance procedure, asked union members, would the action weaken the membership's image of its union? And finally, participants were particularly interested in other unions' experiences with work rule changes in the area of trade overlap and concessionary bargaining on jurisdictional issues. While union members currently involved in work redesign activities acknowledged the need to alter the contract to allow for multi-skilled work groups or composite crews in their yards, others commented on their fear of losing bargaining power under circumstances where the craft distinction was lost. As the session came to a close, several members summed up their feelings on the discussion. We know we are able to assist our employers in saving jobs and increasing competitive standing, but feel strongly that survival of the company should not beat the expense of the union.

Later in the afternoon, a second workshop was held for further discussion of union concerns. Management representatives were present as observers and towards the end of the meeting were invited to participate. This portion of the workshop focused on a variety of issues including

- the ultimate goals in instigation of a labor-management cooperation program and its role in the organization,
- the use of contractual language to spell out the goals and groundrules of employee involvement activities,
- the need for management to re-evaluate their view of the skills and abilities of their workforce,

- concerns over the continuation of participative practices during economic upturn,
- whether union members committed to labor-management activities will continue to scrutinize the process from an objective stance,
- the role of government and legislation in assisting U.S. shipbuilders,
- the importance of creating a knowledgeable and informed work force through exposure to the experience of other companies and unions,
- the benefits of training as preparation for participative activities and everyday opportunities for problem-solving, and
- the similarities of union and management concerns over employee involvement and the importance of mutual support.

Some workshop participants expressed additional concerns over the length of time required to establish a conducive environment for cooperative labor-management activities. Many speakers recognized the critical importance of trust, yet understood that it is not easily achieved in situations which have been traditionally adversarial. Time is a limited resource in a declining industry and shipbuilding is no exception. Under these circumstances, suggested experienced union members, a neutral third party can facilitate this building of a positive relationship between labor and management. Often, an outsider can be of further help in the establishment and acceptance of workplace change.

Workshop members concluded the session by expressing their interest in future opportunities for open discussion of union concerns and accomplishment in labor-management activities. Several participants identified the need for a network of unions involved in participative programs and suggested regional meetings for all shipyards. Other members offered their support in making arrangements for these gatherings. This valuable exchange of ideas and experiences was indeed a highlight for all involved.

The question, "Why would anyone want to begin an employee involvement program?", was asked by both members of labor and management as well as by members of the public in general. The reasons given for establishing employee involvement within a business vary with the respondents. Some people feel it is "smart business," others seek to smash the hierarchical pyramid that exists in most corporations. The need to convey the belief that in an organization everyone sinks or swims together is another reason. On a more macro level, some view industry as going through apolitical revolution of democratization. Americans like getting involved and this sense of involvement should also be applied to the workplace.

The country as a whole is facing changes that affect the way American businesses will operate in regard to their employees. Some claim the value system of the country has changed with the aging of the "baby-boomers." This group of people is not satisfied with passively following commands. They seek to become part of the decision-making process. The impact of technology and the realization that American businesses are operating in the world market are other factors that make employee involvement programs important for the well-being of American businesses. Many people feel that if management doesn't do something soon, it will wake up and find its business gone.

Although many arguments for the establishment of employee involvement programs are appropriate for businesses facing economic hard times, many have wondered whether businesses that are doing well need to change their organizational structures and implement employee involvement. One response to this is that regardless of the condition of a business, employee involvement can make a company more effective and efficient. Even if you are doing well, is it not smart business to make your company more efficient? If healthy businesses fail to change, it is very possible that they will become “dinosaurs” in the near future. It is important for the leader of an organization to look into the future and try to change the organization before the future changes.

How To Start And Sustain Employee Involvement Efforts

One suggested approach to initiating employee involvement is change from the top down. The first step is to change the way management manages. After this change is complete, management should contact the union. Since there is the likelihood that coordination problems may occur at the bottom of the organizational structure, mini-organizations (“shadow organizations” such as quality circles) should be created for that section. Management

The process of starting an employee involvement program will be different for different companies. Companies must fashion a program that best fits their organization. They must realize that individuals need to be recognized and have a desire to receive credit for the work they do. If an organization wants its employees to behave as adults, it must start treating them as adults.

Several steps are involved in setting up an employee involvement program. The first step is one of exploration and discussion. Next, data is gathered to determine the climate and to evaluate the employee involvement plan. After the plan is approved, pilot groups are started. It is important that these groups are provided with the support they need. In some cases, there may be a need for help from consultants outside of the organization.

should explore the mini-organization establishment phase with the commitment of changing the entire organization. Shadow organizations provide a learning experience for management, and management in turn should apply what it learns to the entire organization. Quality circles cannot survive on their own. Without a change in the pyramid of the organization, Q.C.'s will wither and eventually die.

Resistance To Change

When organizations integrate new concepts such as quality circles, study teams, or labor-management committees into their workplaces, they often introduce a substantial amount of change from the traditional way of doing business. These participative activities have a tendency to bring about new relationships between supervisors and workers, create new roles and responsibilities for employees, and challenge the abilities of both union and management to remain flexible. Many cooperative labor-management activities are well structured and planned out, yet few of them include a conscious process of how to deal with those who choose to resist these changes.

Labor and management can be hesitant to commit themselves to new activities for several different reasons. One explanation is the perceived lack of communication between the planners and participants. Employees who are not involved in the initial generation of ideas may feel their opinions are being sidestepped or that the information they receive concerning the activity is being filtered through an organizing committee. Others involved in a new concept of organization take the “we’ve tried it before and it didn’t work” attitude, or see the changes to their work schedule as just plain inconvenient. If the changes taking place appear to threaten the strength of either the union or management, lack a clear commitment by the leaders of both sides, or imply a lack of trust among participants, there will be a further tendency to retreat from involvement.

Whatever the reasons for resistance, the critical question comes down to this: what kind of approach ought we take as management and union leaders to alleviate the problems that result from a reluctance to accept change? If we examine the various feelings of resistance, an underlying theme begins to surface: members of both labor and management will respond unfavorably towards newly designed organizations of work if they feel they have no alternative but to accept the activity as it is presented. In other words, employees feel trapped into carrying out “someone else’s

plan” without having an opportunity to make suggestions or deny membership. Once this concept is understood, the initial step in solving the problem may lie in providing an option for participants to buy out of the activity. Employees who understand that they have a choice over whether or not to become active and are given a chance for a trial run will be much more likely to give the new processes a try.

But by making involvement in labor-management activities voluntary, won’t its success be endangered if key members of the workforce choose not to participate? Maybe so. To prepare for this reality, labor and management must ask themselves now that we’ve established this program for the organization, what’s in it for the individual? All too often, the answer reveals that there is really nothing extra for participation, especially in the form of compensation. Some organizations have responded to this problem by honoring employees who exhibit the greatest support or development of the activities at annual awards programs. Another alternative, for management in particular, is to incorporate participative considerations into performance appraisal where employees are rated on the degree to which they implement the program’s philosophy. Because the workforce is often seen to be the most valuable resource in companies initiating cooperative activities, employees, and especially managers, are expected to know or learn how to enhance involvement in the company and to demonstrate how this might be carried out. It is suggested that once managers see how benefits can be awarded for their commitment to participative activities, their involvement may increase.

Whether or not to direct employees to mandatorily participate in labor management activities is something each organization must decide. Some managers, for example, feel uncomfortable performing the required skills in this new activity and will need help in problem solving, group discussion, etc. Too frequently management training is concentrated around the time of promo-

tion after which we expect supervisors to be proficient in all aspects of the job. This just isn't so. As changes are introduced into the organization, management and the employees they supervise must be given the tools to deal with them.

How many companies actually put their training to good use? Probably, not enough. IBM serves as one model for organizations considering the expansion or development of a training program. At IBM, every employee will participate in at least 28 hours of training a year, 12 of these must be in human resource skills even if this has nothing to do with the specific job they hold. Managers must spend a minimum of 40 hours a year in training, 28 of

which are in human resources. While many organizations offer training opportunities to their managers and employees, this activity will only be of value if it targets the specific needs of the organization. A preliminary analysis of the company, its jobs, and employees can help an organization distinguish between a deficiency of knowledge among its employees and inefficient work design. Effective training and voluntary participation in work change activities are just two methods of encouraging labor and management to look to new ways of solving old problems and to accept changes in their organizations with a more open mind.

Nuts And Bolts Of Problem-Solving Teams

Programs of worker involvement with the production processes are no longer new in many of the U.S. shipyards. Some have already experienced using problem-solving teams for several years. The formation of direct participation programs is, however, only the beginning of a long process for changing organizational structures and industrial relations. Because of its unconventional methods of decision making, it can cause difficulties for organizations. In order to successfully run problem-solving teams in American shipyards, it is important for both management and labor unions to recognize these difficulties and to understand the nuts and bolts of small team activity.

One of the primary difficulties arises from the undefined nature and position of the problem-solving teams within the organization. In many cases they are informal groups consisting of low-echelon workers who have very little authority to make decisions. Misunderstanding by middle management and the resulting low effectiveness of the yard in implementing solutions often leads to the demise of the small groups. The other important issue involves the group's relationship to labor unions. Skepticism of labor unions concerning worker participation can leave problem-solving teams without adequate sanction.

Hence the first step is to clarify basic definitions as to who does what and how in the problem-solving teams, as well as how far they can go with management and labor unions. Two types of team activity are possible. One type limits the activity to improving the quality of working life, where the teams select their goals

and problems to solve. The other type is mainly for increasing productivity, for which management chooses its goals and problems. Although it is found by workers that the first type often generates higher enthusiasm among the participants than the second, procedures of solving problems and implementing the solutions must be clearly understood in either case by all members involved in the program.

Once the structure is clear the next step is to prepare the participants for small group activity. Since it is based on teamwork, the efficiency of group activities greatly depends on the basic orientation and understanding of the participants. Training is essential for the purpose of brainstorming and cultivating leadership within the group. Of all important issues concerning the successful operation of problem-solving teams, the role of team leaders cannot be over-emphasized. One method of creating strong leadership is to have members select their own leaders.

Implementation of solutions directly relates to the success of problem-solving teams. As pointed out earlier, what the teams are permitted to do and how far they can go in the organization has to be clearly defined. It may be wise for teams to focus on their regular routine work so that actual changes in the production processes are tangible and measurable. The issue of rewards relates to the feasibility of solutions. The positive experiences of problem-solving teams in improving quality of worklife should be taken into account in creating constructive participation programs in American shipyards.

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